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(54) **SCREEN CONTROL METHOD APPLIED TO FOLDABLE SCREEN DEVICE AND RELATED APPARATUS**

(57) This application provides a screen control method applied to a foldable screen device and a related apparatus. In the method, the foldable screen device includes a first physical screen, and the first physical screen includes a first screen area and a second screen area. When the foldable screen device is in a first physical form, the first screen area is on, and the second screen area is blank; and in response to switching from the first physical form to a second physical form, the second

screen area is controlled to be on, the first screen area is controlled to be blank, and the first screen area is controlled to be powered off. In this application, after the second screen area of the first physical screen is blank, the second screen area may be controlled to be powered off, so that power consumption of the foldable screen device can be reduced, and standby time can be increased.

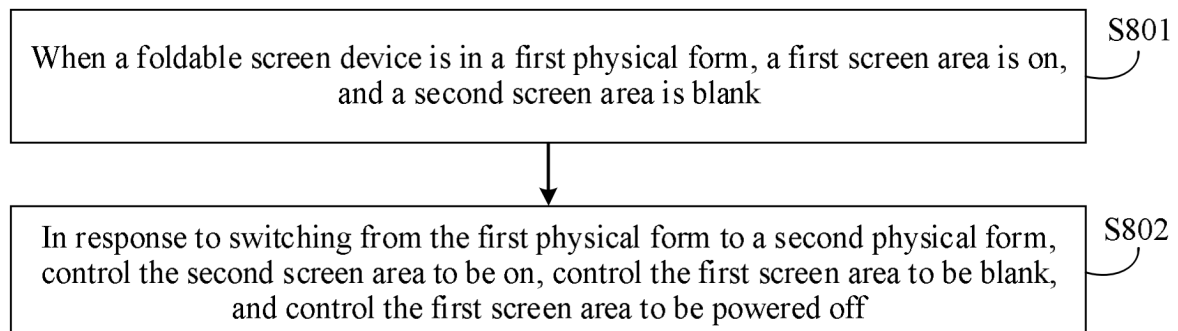


FIG. 8

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Description

[0001] This application claims priority to Chinese Patent Application No. 202410789488.4, filed with the China National Intellectual Property Administration on June 18, 2024, and entitled "SCREEN CONTROL METHOD APPLIED TO FOLDABLE SCREEN DEVICE AND RELATED APPARATUS", which is incorporated herein by reference in its entirety.

TECHNICAL FIELD

[0002] Embodiments of this application relate to the field of foldable screen device technologies, and in particular, to a screen control method applied to a foldable screen device and a related apparatus.

BACKGROUND

[0003] With development of terminal devices, foldable screen devices have been widely used. A user may use different screens in the foldable screen device by performing operations such as folding and unfolding. For example, the user may unfold the foldable screen device, to watch a video on a large screen. Alternatively, the user may fold the foldable screen device, to view information like time on a small screen.

[0004] As a physical form of the foldable screen device changes, the foldable screen device may adjust a corresponding screen to be on or blank. Currently, after the screen is blank, the screen still consumes power. This increases power consumption of the foldable screen device and reduces standby time.

SUMMARY

[0005] Embodiments of this application provide a screen control method applied to a foldable screen device and a related apparatus. After a part of screen areas of a physical screen is blank, the part of screen areas may be controlled to be powered off, so that power consumption of the foldable screen device can be reduced, and standby time can be increased.

[0006] According to a first aspect, an embodiment of this application provides a screen control method applied to a foldable screen device. The method may be performed by the foldable screen device, one or more chips in the foldable screen device, or at least one module in the chip. The following uses an example in which the method is performed by the foldable screen device for description. In the method, the foldable screen device includes a first physical screen, and the first physical screen includes a first screen area and a second screen area. It may be understood that the first physical screen may be considered as one physical screen, and one physical screen may be divided into a plurality of screen areas. The following uses the first screen area and the second screen area as an example for description.

[0007] When the foldable screen device is in a first physical form, the first screen area is on, and the second screen area is blank. In response to switching from the first physical form to a second physical form, the foldable screen device may control the second screen area to be on, control the first screen area to be blank, and control the first screen area to be powered off.

[0008] In this embodiment of this application, after controlling the first screen area of the first physical screen to be blank, the foldable screen device may further control the first screen area to be powered off, so that power consumption of the foldable screen device can be reduced, and standby time can be increased.

[0009] In a possible implementation, the first physical screen is a liquid crystal display, and the liquid crystal display includes a backlight panel and a liquid crystal layer. When the first screen area is on, the backlight panel corresponding to the first screen area is in a power-on state, and the liquid crystal layer corresponding to the first screen area is in a power-on state. The following describes a manner in which the foldable screen device controls the first screen area to be powered off.

[0010] First, when the first screen area is blank, the backlight panel corresponding to the first screen area is in the power-on state, the liquid crystal layer corresponding to the first screen area is in the power-on state, and the liquid crystal layer completely blocks light from the backlight panel.

[0011] In this manner, the foldable screen device may control the backlight panel corresponding to the first screen area to be powered off, and control the liquid crystal layer corresponding to the first screen area to be powered off, to complete controlling the first screen area to be powered off.

[0012] Second, when the first screen area is blank, the backlight panel corresponding to the first screen area is in a power-off state, and the liquid crystal layer corresponding to the first screen area is in the power-on state.

[0013] In this manner, the foldable screen device may control the liquid crystal layer corresponding to the first screen area to be powered off, to complete controlling the first screen area to be powered off.

[0014] In this embodiment of this application, the foldable screen device controls power-off of the first screen area in various manners, which is easy to implement and has a wide application scope.

[0015] In a possible implementation, the foldable screen device includes a plurality of shafts, and the foldable screen device implements a physical form change through any one of the shafts. In response to switching from the first physical form to the second physical form, the foldable screen device controls the second screen area to be on and controls the first screen area to be blank. In addition, before the first screen area is controlled to be powered off, a first display mode may be further determined based on a folding angle corresponding to each shaft and a physical form corresponding to each shaft. The first display mode indicates the first

screen area to switch from a screen-on state to a blank screen state, and indicates the second screen area to switch from a blank screen state to a screen-on state. In this way, in response to the first display mode, the foldable screen device may control the second screen area to be on, control the first screen area to be blank, and control the first screen area to be powered off.

[0016] The following describes a manner in which the foldable screen device determines the first display mode.

[0017] In a process in which a user starts to operate the foldable screen device, the foldable screen device may determine whether a first shaft and a second shaft whose folding angles or physical forms change simultaneously exist. The first shaft and the second shaft are included in the plurality of shafts. When the first shaft and the second shaft whose folding angles or physical forms change simultaneously do not exist, the foldable screen device may perform independent calculation based on the folding angles and the physical forms that correspond to the first shaft and the second shaft, to determine the first display mode.

[0018] For example, at a first moment, the folding angle and the physical form that correspond to the first shaft change, and the foldable screen device may determine the first display mode at the first moment based on the folding angle corresponding to each shaft and the physical form corresponding to each shaft. For example, at a second moment, the folding angle and the physical form that correspond to the second shaft change, and the foldable screen device may determine the first display mode at the second moment based on the folding angle corresponding to each shaft and the physical form corresponding to each shaft. The first moment is a moment at which the folding angle of the first shaft changes, and the second moment is a moment at which the folding angle of the second shaft changes.

[0019] In some embodiments, for example, when the first moment is a moment at which the folding angle and the physical form that correspond to the first shaft meet a condition for triggering a status change of a screen area, at the first moment, the foldable screen device may determine the first display mode at the first moment based on the folding angle corresponding to each shaft and the physical form corresponding to each shaft. For example, when the second moment is a moment at which the folding angle and the physical form that correspond to the second shaft meet a condition for triggering a status change of a screen area, at the second moment, the foldable screen device may determine the first display mode at the second moment based on the folding angle corresponding to each shaft and the physical form corresponding to each shaft.

[0020] When the first shaft and the second shaft whose folding angles or physical forms change simultaneously exist, the foldable screen device may perform the following operations: The foldable screen device may determine, based on the folding angle of the first shaft, whether the first shaft is in a half-folding critical state. When the

first shaft is in the half-folding critical state, the folding angle of the first shaft is within a folding angle range.

[0021] When the first shaft is not in the half-folding critical state, a status of a screen area corresponding to the first shaft does not change within a preset time, and no screen jump occurs in a scenario in which the user simultaneously operates a plurality of shafts. In this scenario, the foldable screen device may perform comprehensive calculation based on the folding angle and the physical form that correspond to each shaft, to determine the display mode. For example, the foldable screen device may determine the first display mode based on the folding angle corresponding to each shaft and the physical form corresponding to each shaft.

[0022] When the first shaft is in the half-folding critical state, a status of a screen area corresponding to the first shaft changes within a preset time, and a screen jump occurs in a scenario in which the user simultaneously operates a plurality of shafts. In this scenario, in response to the folding angle and the physical form that are of the first shaft, the screen switching module may first skip determining the display mode, because after the display mode is determined, the foldable screen device responds based on the display mode, and a screen jump occurs. In this embodiment of this application, the user operates the first shaft and the second shaft simultaneously, the first shaft is in the half-folding critical state, and the second shaft may also reach the half-folding critical state in a short time. Therefore, the screen switching module may perform comprehensive calculation based on the folding angle and the physical form that are of the second shaft, to avoid a screen jump.

[0023] In this example, when the first shaft is in the half-folding critical state, when the folding angle and the physical form that correspond to the second shaft meet the condition for triggering the status change of the screen area, the foldable screen device may determine the first display mode based on the folding angle and the physical form that correspond to each shaft.

[0024] In this implementation, the foldable screen device may determine whether the first shaft and the second shaft whose folding angles or physical forms change simultaneously exist. When the first shaft and the second shaft that change simultaneously do not exist, the user independently operates the shafts, and the foldable screen device may sequentially respond to the operations of the user to determine the display mode, so as to enable the foldable screen device to control the status of the corresponding screen area. When the first shaft and the second shaft that change simultaneously exist, if the first shaft is not in the half-folding critical state, the foldable screen device may determine the display mode based on the folding angle and the physical form that correspond to each shaft. If the first shaft is in the half-folding critical state, the foldable screen device may wait, and when the folding angle and the physical form that correspond to the second shaft meet the condition for triggering the status change of the screen area, the

foldable screen device determines the display mode based on the folding angle and the physical form that correspond to each shaft. This can improve precision of screen control.

[0025] In the foregoing example, a scenario in which a part of screen areas of the first physical screen is in the power-off state is described. In a possible scenario, the first physical screen is in a power-off state, the first screen area is blank and is in the power-off state, the second screen area is blank, and the second screen area is also in the power-off state. In this scenario, the foldable screen device may perform the following operations:

[0026] When the foldable screen device is in a third physical form, the first screen area is blank, the second screen area is blank, and the first physical screen is in the power-off state. For example, the third physical form is a folded state. In response to switching from the third physical form to a fourth physical form, the foldable screen device may control the first physical screen to be powered on, control the first screen area to be on, and control the second screen area to be powered off. For example, when the foldable screen device is unfolded in the folded state, the first screen area may be on, and the second screen area may remain blank.

[0027] In this scenario, the foldable screen device includes a plurality of shafts, and the foldable screen device implements a physical form change through any shaft. In response to switching from the third physical form to the fourth physical form, that is, before the foldable screen device controls the first physical screen to be powered on, a second display mode may be further determined based on the folding angle corresponding to each shaft and the physical form corresponding to each shaft. The second display mode indicates that the first screen area is switched from the blank screen state to a screen-on state, and the second screen area remains blank.

[0028] In this implementation, when the physical form of the foldable screen device is switched from the third physical form to the fourth physical form, the physical screen of the foldable screen device is in the power-off state. Therefore, in a process in which the foldable screen device is unfolded from the folded state, the physical screen may be first controlled to be powered on, to ensure that a screen area on the physical screen can be on subsequently. On the basis of powering on the physical screen, the first screen area is controlled to switch from the blank screen state to the screen-on state, and the second screen area that is still in the blank screen state is powered off. This can also reduce power consumption of the screen area in the blank screen state, and increase standby duration of the foldable screen device.

[0029] In a possible implementation, the foldable screen device includes a sensor service and a screen switching module, and the method includes: The sensor service reports, to the screen switching module, the folding angle corresponding to each shaft and the physical form corresponding to each shaft. Determining the first display mode based on the folding angle correspond-

ing to each shaft and the physical form corresponding to each shaft includes: The screen switching module determines the first display mode based on the folding angle corresponding to each shaft and the physical form corresponding to each shaft.

[0030] In a possible implementation, the foldable screen device further includes a display manager service DMS, a surface finger SF module, a hardware composer HWC, and a display driver. After determining the first display mode, the method further includes: The screen switching module sends the first display mode to the DMS; the DMS sends first information to the SF, where the first information includes the first display mode, and the first information indicates to power off the first screen area; the SF sends second information to the HWC, where the second information includes content of the first information; and the HWC forwards the second information to the display driver.

[0031] Controlling the second screen area to be on, controlling the first screen area to be blank, and controlling the first screen area to be powered off includes: The display driver controls the second screen area to be on, controls the first screen area to be blank, and controls the first screen area to be powered off.

[0032] In a possible implementation, the foldable screen device further includes a window manager service WMS. Before the DMS sends the first information to the SF, the method further includes: The DMS sends the first display mode to the WMS; the WMS performs a screen freezing operation; the WMS draws a window based on the second screen area; the WMS performs an unfreezing operation; the WMS sends a drawn window to the SF.

[0033] The method further includes: The SF performs layer composition on the window to obtain a to-be-displayed image, where the second information further includes the image; and before the SF sends the second information to an HWC, the method further includes: the SF determines whether the first physical screen is in the power-on state.

[0034] That the SF sends the second information to the HWC includes: When the first physical screen is in the power-on state, the SF sends the second information to the HWC. The method further includes: in response to the second information, the display driver controls the second screen area to display the image.

[0035] It may be understood that interaction between internal modules in the foldable screen device is used to implement the screen control method provided in embodiments of this application. For details, refer to implementations in the following embodiments. Details are not described herein again.

[0036] According to a second aspect, an embodiment of this application provides a foldable screen device, including a processor and a memory. The memory is configured to store code instructions, and the processor is configured to run the code instructions, to perform the method according to any one of the first aspect or the

possible implementations of the first aspect.

[0037] According to a third aspect, an embodiment of this application provides a computer-readable storage medium. The computer-readable storage medium stores a computer program or instructions, and when the computer program or the instructions are run on a computer, the computer is enabled to perform the method described in any one of the first aspect or the possible implementations of the first aspect.

[0038] According to a fourth aspect, an embodiment of this application provides a computer program product including a computer program. When the computer program is run on a computer, the computer is enabled to perform the method described in any one of the first aspect or the possible implementations of the first aspect.

[0039] According to a fifth aspect, this application provides a chip or a chip system, where the chip or the chip system includes at least one processor and a communication interface, the communication interface and the at least one processor are interconnected through a line, and the at least one processor is configured to run a computer program or instructions, so that the method described in any one of the first aspect or the possible implementations of the first aspect is performed. The communication interface in the chip may be an input/output interface, a pin, a circuit, or the like.

[0040] In a possible implementation, the chip or the chip system described above in this application further includes at least one memory, and the at least one memory stores instructions. The memory may be a storage unit inside the chip, for example, a register or a cache, or may be a storage unit (for example, a read-only memory or a random access memory) of the chip.

[0041] It should be understood that the technical solutions of the second aspect to the fifth aspect of this application correspond to the technical solutions of the first aspect of this application. Beneficial effect achieved by the aspects and corresponding feasible implementations is similar, and details are not described again.

BRIEF DESCRIPTION OF DRAWINGS

[0042]

FIG. 1 is an example diagram of foldable screen devices to which an embodiment of this application is applicable;

FIG. 2 is a diagram of a structure of an LCD screen; FIG. 3 is an example diagram of physical forms of a dual-shaft foldable screen device;

FIG. 4 is a block diagram of a structure of a foldable screen device to which an embodiment of this application is applicable;

FIG. 5 is a schematic flowchart of a screen control method;

FIG. 6 is a schematic flowchart of another screen control method;

FIG. 7A is a schematic flowchart of a screen control

method applied to a foldable screen device according to an embodiment of this application;

FIG. 7B is a schematic flowchart of determining a display mode by a screen switching module according to an embodiment of this application;

FIG. 7C-1 and FIG. 7C-2 are another schematic flowchart of a screen control method applied to a foldable screen device according to an embodiment of this application;

FIG. 7D-1 and FIG. 7D-2 are another schematic flowchart of a screen control method applied to a foldable screen device according to an embodiment of this application;

FIG. 8 is another schematic flowchart of a screen control method applied to a foldable screen device according to an embodiment of this application; and FIG. 9 is a diagram of a structure of a foldable screen device according to an embodiment of this application.

DESCRIPTION OF EMBODIMENTS

[0043] For ease of understanding, the following first describes related terms and concepts in embodiments of this application.

1. Foldable screen device: The foldable screen device is a device whose physical form can be folded or unfolded. In some embodiments, the foldable screen device is a device whose screen can be folded or unfolded.

[0044] In some embodiments, a folding manner of the foldable screen device may include folding inward, folding outward, and/or the like. In addition, the folding manner may further include folding upward, folding downward, folding leftward, folding rightward, folding toward any direction, and/or the like.

[0045] In some embodiments, the foldable screen device may be folded once, twice, or even more times. For example, as shown in a in FIG. 1, the foldable screen device includes one shaft, and the foldable screen device may be folded or unfolded through the shaft. In some embodiments, the foldable screen device may be referred to as a single-shaft foldable screen device. As shown in b in FIG. 1, The foldable screen device includes two shafts: a shaft 1 and a shaft 2. The foldable screen device may be folded or unfolded through either of the two shafts. In some embodiments, the foldable screen device may be referred to as a dual-shaft foldable screen device.

[0046] In some embodiments, the foldable screen device may include at least one physical screen. For example, as shown in a in FIG. 1, the foldable screen device may include a first screen 11 and a second screen 12. The first screen 11 and the second screen 12 are two independent physical screens, and the second screen 12 may include two screen areas. For example, the two

screen areas may be divided by the shaft of the foldable screen. In some embodiments, the first screen 11 may be referred to as an external screen, and the second screen 12 may be referred to as an internal screen. For example, as shown in b in FIG. 1, the foldable screen device may include a first screen 11A, a second screen 12A, and a third screen 13A. The first screen 11A, the second screen 12A, and the third screen 13A belong to different screen areas on a same physical screen.

[0047] In conclusion, one physical screen of the foldable screen device may be divided into at least one screen area, and the foldable screen device may independently control each screen area to be on or blank. A screen control method applied to the foldable screen device provided in embodiments of this application may be applied to different screen areas on one physical screen, or may be applied to different physical screens. In the following embodiments, a plurality of screen areas on one physical screen are used as an example for description.

[0048] It should be understood that a folding manner, a quantity of folding times, a quantity of physical screens, a quantity of screen areas divided on each physical screen, and the like of the foldable screen device are not limited in embodiments of this application.

[0049] 2. Screen:

In embodiments of this application, the screen of the foldable screen device may be a liquid crystal display (liquid crystal display, LCD). FIG. 2 is a diagram of a structure of an LCD screen. Refer to FIG. 2. The LCD screen may include a backlight panel, a liquid crystal layer, and a light filter. The backlight panel is a light-emitting layer that emits white light. One screen may include a complete backlight panel, or the backlight panel may be divided into several parts, that is, partitioned backlight. The liquid crystal layer is disposed above the backlight panel, and the liquid crystal layer corresponds to a drive circuit. The drive circuit may control a voltage, implement different orientations of liquid crystal molecules, and control the liquid crystal layer to block or transmit light from the backlight panel. Because the backlight panel emits white light, the light filter of the three primary colors is disposed above the liquid crystal layer to convert the backlight into light of another color, so that different colors are displayed on the LCD screen.

[0050] 3. Screen-on: In a screen-on state, text and pictures can be displayed on a screen. In some embodiments, content such as text and graphics displayed on the screen may be collectively referred to as images. In the following embodiments, an image displayed on the screen is used as an example for description.

[0051] For the LCD screen, screen-on means that the backlight panel is in a power-on state, and the liquid crystal layer is in a power-on state. In the screen-on state, the backlight panel emits light, and the drive circuit may control a voltage and implement orientations of liquid crystal molecules, to implement light transmission.

[0052] 4. Blank screen: In a blank screen state, a

screen is blank and no image is displayed.

[0053] For the LCD screen, in some embodiments, the blank screen means that the backlight panel is in a power-on state, and the liquid crystal layer is in a power-on state. In this example, in the blank screen state, the backlight panel emits light, and the drive circuit controls a voltage to adjust the liquid crystal layer to completely block light from the backlight panel. In this way, the light emitted by the backlight panel cannot penetrate the liquid crystal layer, the screen is blank, and an image cannot be displayed.

[0054] For the LCD screen, in some embodiments, the blank screen means that the backlight panel is in a power-off state, and the liquid crystal layer is in a power-on state. In this example, in the blank screen state, the backlight panel does not emit light. In this case, regardless of orientations of liquid crystal molecules at the liquid crystal layer, the screen is blank, and an image cannot be displayed.

[0055] In some embodiments, a shaft in the foldable screen may be a bendable hinge. The foldable screen device may include at least one bendable hinge, the foldable screen device may have at least one bending combination, and the bending combination is a combination of hinges that perform bending. Different bending combinations correspond to different display areas, and the display area is a screen area in which a screen is on and an image is displayed. When a user bends the foldable screen device into a physical form, a part of screen areas is on and an image is displayed, and a part of screen areas is blank.

[0056] 5. Screen-off: In a screen-off state, a screen is blank and no image is displayed.

[0057] For the LCD screen, in some embodiments, screen-off means that the backlight panel is in a power-off state, and the liquid crystal layer is in a power-off state.

[0058] 6. Screen power-off: In embodiments of this application, the backlight panel is in a power-off state, and the liquid crystal layer is in a power-off state. Correspondingly, that the screen is not powered off means that the liquid crystal layer is in a power-on state, and the backlight panel may be in a power-on state or a power-off state.

[0059] 7. Folded state: In embodiments of this application, the folded state means that the foldable screen device is completely folded, and a folding angle corresponding to any shaft is 0°. For example, the dual-shaft foldable screen device is used as an example. a in FIG. 3 shows that the dual-shaft foldable screen device is in the folded state.

[0060] 8. Unfolded state: In embodiments of this application, the unfolded state means that the foldable screen device is completely unfolded, and a folding angle corresponding to any shaft is 180°. For example, the dual-shaft foldable screen device is used as an example. c in FIG. 3 shows that the dual-shaft foldable screen device is in the unfolded state.

[0061] In some embodiments, a state between the folded state and the unfolded state may be referred to as a semi-folded state or an intermediate state, as shown in b in FIG. 3.

[0062] 9. The foldable screen device in embodiments of this application may be referred to as user equipment (user equipment, UE), a terminal (terminal), or the like. For example, the foldable screen device may be a mobile phone, a tablet computer (tablet), a personal digital assistant (personal digital assistant, PDA), a handheld device having a wireless communication function, a computing device, a vehicle-mounted device, a wearable device, a virtual reality (virtual reality, VR) terminal device, an augmented reality (augmented reality, AR) terminal device, a wireless terminal in industrial control (industrial control), a wireless terminal in smart home (smart home), and the like. A form of the foldable screen device is not specifically limited in embodiments of this application.

[0063] In some embodiments, a software system of the foldable screen device may use a layered architecture, an event-driven architecture, a microkernel architecture, a microservice architecture, or a cloud architecture. FIG. 4 is a block diagram of a structure of a foldable screen device to which an embodiment of this application is applicable. In the layered architecture, the software system of the foldable screen device is divided into several layers, and each layer has a clear role and task. The layers communicate with each other through a software interface.

[0064] Refer to FIG. 4. In some embodiments, the foldable screen device may include an application (application) layer, an application framework (application framework) layer, a system (native) layer, and a kernel (kernel) layer. Layers of the foldable screen device are not limited in embodiments of this application. Modules included in the layers in the following embodiments are modules in embodiments of this application. The modules included in the following layers do not constitute a limitation on the structure of the foldable screen device, and a layer at which the modules are deployed (example description) does not constitute a limitation on the structure of the foldable screen device.

[0065] The application layer may include a series of application packages, and the application layer runs an application by invoking an application programming interface (application programming interface, API) provided by the application framework layer. In FIG. 4, an example in which the application layer includes an application is used.

[0066] The application framework layer may provide an API and a programming framework for an application at the application layer. The application framework layer includes some predefined functions. In some embodiments, the application framework layer may provide a system service. Refer to FIG. 4. The application framework layer may include a screen switching module, a display manager service (display manager service,

DMS), a surface finger (surface finger, SF) module, a window manager service (window manager service, WMS), and a wake-up power (power).

[0067] The screen switching module may maintain a mapping relationship between a folding angle, a physical form, and a display mode (display mode) of the foldable screen device. In some embodiments, the folding angle of the foldable screen device may also be referred to as a bending angle.

[0068] The physical form of the foldable screen device may include a folded state, a semi-folded state, and an unfolded state.

[0069] The display mode indicates a status of a screen area. In some embodiments, the screen area may be a physical screen or a part of a physical screen. In embodiments of this application, an example in which the screen area is a part of a physical screen is used for description.

[0070] In some embodiments, the status of the screen area may include a screen-on state, a blank screen state, and a screen-off state. However, in the mapping relationship that is between the folding angle, the physical form, and the display mode of the foldable screen device and that is maintained by the screen switching module, the screen switching module may maintain a mapping relationship between the folding angle, the physical form, and "a screen-on state and a blank screen state", that is, in the mapping relationship, the status of the screen area may include the screen-on state and the blank screen state. In the following embodiments, "the mapping relationship between the folding angle, the physical form, and the display mode of the foldable screen device" may be referred to as a mapping relationship for short.

[0071] For example, the dual-shaft foldable screen device is used as an example to describe the mapping relationship maintained in the screen switching module. As shown in FIG. 3, the dual-shaft foldable screen device includes a first screen area, a second screen area, and a third screen area. The first screen area, the second screen area, and the third screen area belong to a same physical screen.

[0072] Refer to a in FIG. 3. When the foldable screen device is in the folded state, in other words, folding angles corresponding to two shafts are both 0°, the display mode indicates that "the first screen area is on, and the second screen area and the third screen area are blank". Correspondingly, in response to that a user folds the dual-shaft foldable screen device to the folded state, the electronic device may control, based on the mapping relationship, the first screen area to be on, and control the second screen area and the third screen area to be blank. Refer to b in FIG. 3. When folding angles corresponding to two shafts are unfolded to preset angles, the display mode indicates that "the first screen area is on, and the second screen area and the third screen area are switched from a blank screen state to a screen-on state". Correspondingly, in response to that the user unfolds the dual-shaft foldable screen device from the folded state to the preset angles, the electronic device may control, based on the

mapping relationship, the second screen area and the third screen area to be on. Refer to c in FIG. 3. When the foldable screen device is in the unfolded state, in other words, folding angles corresponding to two shafts are both 180°, the display mode indicates that "the first screen area, the second screen area, and the third screen area are all on". Correspondingly, in response to that the user unfolds the dual-shaft foldable screen device to the unfolded state, the electronic device may control, based on the mapping relationship, the first screen area, the second screen area, and the third screen area to be all on.

[0073] It may be understood that, as the folding angle and the physical form of the foldable screen device change, different screen areas are on or blank because the mapping relationship between the folding angle, the physical form, and the display mode of the foldable screen device is maintained in the screen switching module. In a process in which the user folds or unfolds the foldable screen device, the screen switching module may determine the display mode of the foldable screen device based on the folding angle and the physical form of the foldable screen device, and the mapping relationship. Correspondingly, the screen switching module may control, based on the display mode, a corresponding screen area to be on or blank.

[0074] It may be figured out that, because the foldable screen device may include a plurality of shafts, in the mapping relationship maintained by the screen switching module, the folding angle of the foldable screen device may include a folding angle corresponding to each shaft, and the physical form of the foldable screen device may include a physical form corresponding to each shaft. In other words, the screen switching module may maintain a mapping relationship between the folding angle corresponding to each shaft in the foldable screen device, the physical form corresponding to each shaft in the foldable screen device, and the display mode.

[0075] The folding angle corresponding to the shaft may be understood as an included angle between screen areas corresponding to the shaft. The screen areas corresponding to the shaft may be understood as screen areas that are folded or unfolded through the shaft. For example, as shown in b in FIG. 1, screen areas corresponding to the shaft 1 include the first screen 11A and the second screen 12A, and a folding angle corresponding to the shaft 1 may be understood as an included angle between the first screen 11A and the second screen 12A.

[0076] The physical form corresponding to the shaft may be understood as physical forms of at least two screen areas corresponding to the shaft.

[0077] In some embodiments, when the display mode changes, the screen switching module may notify the DMS of the display mode.

[0078] The DMS is configured to manage a screen-related module, and is further configured to manage a connection, configuration, and the like of the screen.

[0079] In some embodiments, the DMS may maintain

the display mode. In other words, the DMS may determine a status of each screen area in the foldable screen device based on the display mode. In embodiments of this application, when the DMS receives the display mode from the screen switching module, the DMS may determine the status of each screen area in the foldable screen device.

[0080] In some embodiments, the DMS may synchronize the display mode with the SF.

[0081] A to-be-displayed image in the screen area may include different image layers. A home screen is used as an example. For example, the home screen may include a wallpaper at a bottom layer, an application icon at an upper layer of the wallpaper, and the like. The SF is configured to perform layer composition in a sequence of image layers from top to bottom to obtain the to-be-displayed image.

[0082] In embodiments of this application, when the SF receives the display mode from the DMS, the SF may determine a status of a screen area corresponding to the display mode. The SF may determine a screen area of the to-be-displayed image (that is, a screen area to be on) and a screen area to be blank.

[0083] The WMS is responsible for creating, displaying, hiding, and moving a window in a screen area, and can ensure that windows are displayed in a correct sequence and in correct locations.

[0084] The wake-up power is configured to control a screen to be powered on. It should be understood that, when the screen is in a power-off state, a liquid crystal layer in the screen is in a power-off state, and a backlight panel is in a power-off state. That the wake-up power controls the screen to be powered on may be understood as controlling the backlight panel and the liquid crystal layer to be powered on.

[0085] The system layer may include a local service and some link libraries. Refer to FIG. 4. The system layer may include a sensor service and a hardware composer (hardware composer, HWC).

[0086] The sensor service is configured to report data from a sensor driver to the screen switching module. The data reported by the sensor driver to the sensor service may include but is not limited to a folding angle of the foldable screen device and a physical form of the foldable screen device. It should be understood that, because the foldable screen device may include at least one shaft, the folding angle of the foldable screen device may include a folding angle corresponding to each shaft, and the physical form of the foldable screen device may include a physical form corresponding to each shaft.

[0087] The HWC is configured to assist the SF in layer composition.

[0088] The kernel layer is a layer between hardware and software. The kernel layer is configured to drive the hardware, so that the hardware operates. Refer to FIG. 4. The kernel layer may include a first sensor driver, a second sensor driver, and a display driver.

[0089] The first sensor driver is configured to drive a

first sensor to operate. The first sensor may include but is not limited to a gravity sensor (G-sensor), a gyroscope, and the like. In a process in which the user uses the foldable screen device, the first sensor like the gravity sensor or the gyroscope may report data collected by the first sensor to the first sensor driver, and the first sensor driver may determine the folding angle of the foldable screen device based on the data reported by the first sensor.

[0090] In some embodiments, the first sensor driver may report the folding angle of the foldable screen device to the sensor service.

[0091] The second sensor driver is configured to drive a second sensor to operate. The second sensor may be a Hall (hall) effect sensor. In a process in which the user uses the foldable screen device, the Hall effect sensor may report data collected by the Hall effect sensor to the second sensor driver, and the second sensor driver may determine the physical form of the foldable screen device based on the data reported by the Hall effect sensor. The physical form of the foldable screen device may include the folded state, the semi-folded state, the unfolded state, and the like.

[0092] In some embodiments, the second sensor driver may report the physical form of the foldable screen device to the sensor service.

[0093] The display driver is configured to drive a display to operate. Embodiments of this application relate to a process in which the display driver controls power-on and power-off of the screen.

[0094] In some embodiments, as shown in FIG. 4, the foldable screen device may further include a hardware layer. Corresponding to the kernel layer, the hardware layer may include the first sensor, the second sensor, and a display. The display may be considered as a screen of the foldable screen device. For a structure of the screen, refer to related descriptions in FIG. 2.

[0095] The first sensor may include but is not limited to a gravity sensor, a gyroscope, and the like. The second sensor may be a Hall (hall) effect sensor. In some embodiments, the display may be an LCD.

[0096] In embodiments of this application, the foldable screen device may include at least one shaft. To facilitate determining of the folding angle corresponding to each shaft and the physical form corresponding to each shaft, a group of sensors may be configured for each shaft, and each group of sensors may include a first sensor and a second sensor.

[0097] As the physical form of the foldable screen device changes, the foldable screen device may control, based on the folding angle and the physical form, a corresponding screen area to be on or blank. With reference to the structure of the foldable screen device in FIG. 4, the following describes a process in which the foldable screen device controls a corresponding screen area to be on or blank.

[0098] FIG. 5 is a schematic flowchart of a screen control method. Refer to FIG. 5. The screen control

method may include the following steps.

[0099] Step 1: A first sensor driver reports a folding angle of a foldable screen device to a sensor service.

[0100] The first sensor driver may obtain the folding angle of the foldable screen device based on data reported by the first sensor. The first sensor driver may report the folding angle of the foldable screen device to the sensor service.

[0101] Step 2: The second sensor driver reports a physical form of the foldable screen device to the sensor service.

[0102] It should be understood that there is no sequence between step 1 and step 2, and step 1 and step 2 may be performed simultaneously.

[0103] The second sensor driver may obtain the physical form of the foldable screen device based on data reported by the second sensor. The second sensor driver may report the physical form of the foldable screen device to the sensor service.

[0104] In some embodiments, the second sensor driver may use 0, 1, or a number between 0 and 1 to indicate the physical form of the foldable screen device. For example, 0 may indicate that the physical form of the foldable screen device is a folded state, and 1 may indicate that the physical form of the foldable screen device is an unfolded state. A number between 0 and 1 may indicate that the foldable screen device is in a semi-folded state. A larger number indicates a larger folding angle of the foldable screen device.

[0105] Step 3: The sensor service reports the folding angle and the physical form to a screen switching module.

[0106] Step 4: The screen switching module determines a display mode based on the folding angle and the physical form.

[0107] With reference to the description of the screen switching module in the foregoing embodiment, the screen switching module may maintain a mapping relationship between the folding angle, the physical form, and the display mode. In some embodiments, the screen switching module may determine the display mode of the foldable screen device based on the folding angle, the physical form, and the mapping relationship.

[0108] It may be understood that, when folding angles of the foldable screen device are the same, the foldable screen device may correspond to different display modes when the foldable screen device is in an unfolding process and a folding process. For example, when the foldable screen device is unfolded to a preset angle, a screen area 1 of the foldable screen device may be switched from a blank screen state to a screen-on state. When the foldable screen device is folded to a preset angle, the screen area 1 of the foldable screen device may be switched from a screen-on state to a blank screen state.

[0109] In some embodiments, the first sensor and the second sensor may always collect data, and respectively report data to the first sensor driver and the second

sensor driver at a specific frequency. In this way, step 1, step 2, and step 3 may alternatively be repeatedly performed at a specific frequency. In this way, the screen switching module may receive the folding angle and the physical form that are continuously reported by the sensor service. In this embodiment of this application, the screen switching module may determine, based on the folding angle and/or the physical form that are/is continuously reported by the sensor service, whether the foldable screen device is in the unfolding process or the folding process.

[0110] For example, if the folding angle continuously reported by the sensor service is increasingly large, the screen switching module may determine that the foldable screen device is in the unfolding process, that is, the foldable screen device is unfolded by a user. For example, if the folding angle continuously reported by the sensor service is increasingly small, the screen switching module may determine that the foldable screen device is in the folding process, that is, the foldable screen device is folded by the user.

[0111] For example, the screen switching module may determine, based on a number that is continuously reported by the sensor service and that is between 0 and 1, that the foldable screen device is in the unfolding process, that is, the foldable screen device is unfolded by the user if the number becomes larger; and that the foldable screen device is in the folding process, that is, the foldable screen device is folded by the user if the number becomes smaller.

[0112] In some embodiments, the unfolding process or the folding process of the foldable screen device may also be referred to as the physical form of the foldable screen device. Further, the screen switching module may determine the display mode of the foldable screen device based on the folding angle, the physical form, and the mapping relationship.

[0113] Step 5: The screen switching module sends the display mode to a DMS.

[0114] In some embodiments, the screen switching module may send an identifier of the display mode to the DMS. The identifier of the display mode may include but is not limited to a number, a name, an identifier of a screen-on screen area corresponding to the display mode, an identifier of a screen area of a blank screen corresponding to the display mode, a screen status corresponding to the display mode, or the like. The display mode indicates a screen area to be on and/or a screen area to be blank.

[0115] For example, the identifier of the display mode is "the identifier of the screen-on screen area corresponding to the display mode". The foldable screen device may include a first screen area and a second screen area, and the identifier of the display mode includes an identifier of the first screen area. In other words, the display mode indicates that the first screen area is on, and the second screen area is blank. For example, the identifier of the display mode is "the identifier of the screen area of the

blank screen corresponding to the display mode". The foldable screen device includes a first screen area and a second screen area, and the identifier of the display mode includes an identifier of the first screen area. In other words, the display mode indicates that the first screen area is blank, and the second screen area is on. For example, the identifier of the display mode is "the screen status corresponding to the display mode". The display mode may include: the first screen area-a screen-on state, and the second screen area-a blank screen state.

[0116] A specific representation manner of the display mode is not limited in embodiments of this application.

[0117] Step 6: The DMS invokes an SF to switch a display area.

[0118] With reference to the description of the DMS in the foregoing embodiment, the DMS may maintain the display mode. After the DMS receives the display mode from the screen switching module, the DMS may determine a status of the screen area based on the maintained display mode. After determining the status of the screen area, the DMS may call an interface of the SF to switch the display area.

[0119] That the DMS determines the status of the screen area may be understood as that the DMS determines a screen area to be on and/or a screen area to be blank. That the DMS invokes the interface of the SF to switch the display area may be understood as that the DMS notifies the SF of the screen area to be on and/or the screen area to be blank.

[0120] For example, the DMS may send the display mode to the SF, where the display mode indicates the screen area to be on and/or the screen area to be blank. Alternatively, the DMS may send, to the SF, an identifier of the screen area to be on and/or an identifier of the screen area to be blank.

[0121] The SF may determine the screen area to be on and/or the screen area to be blank. For the screen area to be on, the SF may send a to-be-displayed image to the screen area to be on for display, so that the screen area can display the image. For the screen area to be blank, the SF may drive, via a HWC and a display driver, the screen area to be blank. For this process, refer to descriptions in S711 to S715 in the following embodiment. The SF may perform layer composition to obtain the to-be-displayed image.

[0122] It should be understood that, for the blank screen, refer to the description in the term "LCD screen blank screen" in the foregoing embodiment. When the screen area is blank, the screen (the screen area) is not powered off, and the screen still consumes power. This increases power consumption of the foldable screen device and reduces standby time. That the screen is not powered off means that a liquid crystal layer in the screen is in a power-on state, and a backlight panel is in a power-on state or a power-off state.

[0123] With development of the foldable screen device, there are more screen areas in the foldable screen

device. For a multi-foldable screen device, if a screen area is not powered off after the screen area is blank, a large amount of power consumption is generated.

[0124] In some embodiments, the foldable screen device may be configured with a small-sized LCD screen and a large-sized LCD screen, and the two LCD screens of different sizes are independent physical screens. Refer to FIG. 6. When the foldable screen device detects that an application is started, the foldable screen device may control the large-sized LCD screen to be on, and the large-sized LCD screen may display an application interface, to ensure large-screen experience of the user. When the foldable screen device detects that an application is closed, or an application is not started, the foldable screen device may control the small-sized LCD screen to be on, so that power consumption of the foldable screen device can be reduced while basic use is met. In this example, when the small-sized LCD screen is in a screen-on state, the large-sized LCD screen may be in a power-off state. In this way, the LCD screen does not consume power, and power consumption of the foldable screen device can be reduced.

[0125] In this example, physical screens of different sizes are configured for the foldable screen device, increasing costs. In addition, this method is not applicable to a scenario in which different screen areas on one physical screen are on or blank.

[0126] Based on the foregoing problem, embodiments of this application provide a screen control method applied to a foldable screen device. As a physical form of the foldable screen device changes, the foldable screen device may control a part of screen areas on a physical screen to be on and a part of screen areas to be blank. To reduce power consumption of the foldable screen device, when controlling the part of screen areas to be blank, the foldable screen device may control the part of screen areas to be powered off, to reduce power consumption of the foldable screen device.

[0127] The following describes, with reference to specific embodiments, the screen control method applied to the foldable screen device provided in embodiments of this application. The following several embodiments may be combined with each other, and a same or similar concept or process may not be described repeatedly in some embodiments.

[0128] To facilitate understanding of the screen control method applied to the foldable screen device provided in embodiments of this application, the following first describes a process in which a screen switching module determines a display mode in embodiments of this application.

[0129] Refer to FIG. 7A. A screen control method applied to a foldable screen device provided in an embodiment of this application may include the following steps.

[0130] S701: In response to a change of the foldable screen device from a first physical form to a second physical form, a first sensor driver reports a folding angle

corresponding to a shaft to a sensor service.

[0131] S702: A second sensor driver reports a physical form corresponding to the shaft to the sensor service.

[0132] For S701 and S702, refer to the descriptions in step 1 and step 2.

[0133] It may be understood that, in a process in which the foldable screen device changes from the first physical form to the second physical form, a first sensor and a second sensor may report, at a specific frequency, data respectively collected by the first sensor and the second sensor. Because each shaft of the foldable screen device is configured with one group of sensors, and the group of sensors includes a first sensor and a second sensor, each group of sensors reports data of a shaft corresponding to the group. For example, if the first sensor and the second sensor correspond to a first shaft in the foldable screen device, the first sensor and the second sensor report data of the first shaft.

[0134] In some embodiments, one first sensor corresponds to one first sensor driver, and one second sensor corresponds to one second sensor driver. Correspondingly, the first sensor driver may determine, based on the data from the first sensor, a folding angle corresponding to the first shaft. The second sensor driver may determine, based on the data from the second sensor, a physical form corresponding to the first shaft.

[0135] In this example, each first sensor driver may report, to the sensor service, a folding angle corresponding to one shaft, and each second sensor driver may report, to the sensor service, a physical form corresponding to one shaft. The sensor service may determine, based on data reported by each first sensor driver, a folding angle corresponding to each shaft, and the sensor service may determine, based on data reported by each second sensor driver, a physical form corresponding to each shaft.

[0136] In some embodiments, a plurality of first sensors in the foldable screen device may correspond to one first sensor driver, and a plurality of second sensors correspond to one second sensor driver. Correspondingly, the first sensor driver may determine, based on data from each first sensor, a folding angle corresponding to each shaft. The second sensor driver may determine, based on data from each second sensor, a physical form corresponding to each shaft.

[0137] In this example, the first sensor driver may report the folding angle corresponding to each shaft to the sensor service, and the second sensor driver may report the physical form corresponding to each shaft to the sensor service. Correspondingly, the sensor service may determine the folding angle corresponding to each shaft and the physical form corresponding to each shaft.

[0138] In some embodiments, a plurality of first sensors in the foldable screen device may correspond to at least two first sensor drivers, and a plurality of second sensors may correspond to at least two second sensor drivers. Details are not described in this embodiment of this application.

[0139] In conclusion, regardless of how the first sensor driver and the second sensor driver are configured in the foldable screen device, the sensor service may determine the folding angle corresponding to each shaft and the physical form corresponding to each shaft. It may be understood that FIG. 4 shows an example of the first sensor, the second sensor, the first sensor driver, and the second sensor driver in the foldable screen device.

[0140] For example, the foldable screen device includes a shaft 1, a shaft 2, and a shaft 3. A user operates the shaft 1 and the shaft 2, but does not operate the shaft 3. The first sensor driver may report data of "the shaft 1-10°, the shaft 2-20°, and the shaft 3-0°" to the sensor service, and the second sensor driver may report data of "the shaft 1-a semi-folded state (0.1), the shaft 2-a semi-folded state (0.2), and the shaft 3-a folded state (0)" to the sensor service. It may be understood that, in a process in which the physical form of the foldable screen device changes, the first sensor driver may report, to the sensor service at a specific frequency, the folding angle corresponding to each shaft, and the second sensor driver may report, to the sensor service at a specific frequency, the physical form corresponding to each shaft. The sensor service may determine, based on a change of a folding angle corresponding to each shaft, whether the shaft corresponds to a folding process or an unfolding process. Alternatively, the sensor service may determine, based on a change of a physical form corresponding to each shaft, whether the shaft corresponds to a folding process or an unfolding process. For details, refer to the description in step 4.

[0141] S703: The sensor service reports, to a screen switching module, the folding angle corresponding to each shaft and the physical form corresponding to each shaft.

[0142] S704: The screen switching module determines a display mode based on the folding angle corresponding to each shaft and the physical form corresponding to each shaft.

[0143] In some embodiments, the screen switching module maintains a mapping relationship between the folding angle corresponding to each shaft, the physical form corresponding to each shaft, and the display mode. The screen switching module may determine the display mode based on the folding angle corresponding to each shaft and the physical form corresponding to each shaft from the sensor service, and the mapping relationship.

[0144] For example, as shown in b in FIG. 1, the shaft 1 in the dual-shaft foldable screen device is used as an example. The mapping relationship between the folding angle corresponding to each shaft, the physical form corresponding to each shaft, and the display mode may include: When a folding angle corresponding to the shaft 1 is less than 10°, and a physical form corresponding to the shaft 1 is a semi-folded state (unfolded or folded), the first screen 11A and the second screen 12A are blank. When the shaft 1 is unfolded to a folding angle of 10°, the first screen 11A and the second screen 12A are

on. Correspondingly, when the shaft 1 is unfolded to a folding angle of 10°, that is, the folding angle of the shaft 1 is 10°, and the physical form of the shaft 1 is a semi-folded state (unfolded), the screen switching module determines, based on the mapping relationship, that the display mode is "the first screen 11A and the second screen 12A are on".

[0145] In a scenario in which the foldable screen device includes a plurality of shafts, when the user folds or unfolds the foldable screen device, the user may sequentially operate the plurality of shafts, or simultaneously operate the plurality of shafts. When the user sequentially operates the plurality of shafts, screen areas corresponding to different shafts may sequentially respond (for example, on or blank). When the user simultaneously operates the plurality of shafts, screen areas corresponding to different shafts may respond simultaneously. In addition, the screen areas corresponding to the shafts may overlap, and an operation on one shaft may affect a response of a screen area corresponding to another shaft.

[0146] In this embodiment of this application, to accurately respond to an operation of the user and improve control accuracy of the screen area, in a scenario in which the foldable screen device includes a plurality of shafts, the screen switching module may perform steps shown in FIG. 7B based on the folding angle corresponding to each shaft and the physical form corresponding to each shaft, to determine the display mode.

[0147] S7041: The screen switching module determines whether a first shaft and a second shaft whose folding angles or physical forms change simultaneously exist. If the first shaft and the second shaft whose folding angles or physical forms change simultaneously do not exist, S7042 is performed; or if the first shaft and the second shaft whose folding angles or physical forms change simultaneously exist, S7043 is performed.

[0148] For a same shaft, if a physical form corresponding to the shaft changes, a folding angle corresponding to the shaft also changes accordingly, and the folding angle and the physical form corresponding to the same shaft change simultaneously. The screen switching module determines whether folding angles corresponding to shafts change simultaneously, which can also indicate whether physical forms corresponding to the shafts change simultaneously. Similarly, the screen switching module determines whether physical forms corresponding to shafts change simultaneously, which can also indicate whether folding angles corresponding to the shafts change simultaneously. The following uses an example in which the screen switching module determines whether the folding angles corresponding to the shafts change simultaneously for description.

[0149] It should be understood that, in a scenario in which the foldable screen device includes a plurality of shafts, there may be at least two shafts whose folding angles simultaneously change. In this embodiment of this application, the first shaft and the second shaft are used

as an example for description. In other words, the screen switching module determines whether the first shaft and the second shaft whose folding angles change simultaneously exist.

[0150] In a process in which the physical form of the foldable screen device changes, regardless of whether a physical form corresponding to a shaft changes, a first sensor corresponding to each shaft reports data to the first sensor driver at a specific frequency, and a second sensor corresponding to each shaft reports data to the second sensor driver at a specific frequency. Similarly, the first sensor driver reports, to the sensor service at a specific frequency, the folding angle corresponding to each shaft, and the second sensor driver reports, to the sensor service at a specific frequency, the physical form corresponding to each shaft. Correspondingly, the sensor service reports, to the screen switching module at a specific frequency, the folding angle corresponding to each shaft and the physical form corresponding to each shaft.

[0151] The folding angle is used as an example. The screen switching module may determine, based on the folding angle corresponding to each shaft reported by the sensor service and reporting time, time at which the folding angle corresponding to each shaft changes. The screen switching module may determine, based on the time at which the folding angle corresponding to each shaft changes, whether the first shaft and the second shaft whose folding angles change simultaneously exist. Similarly, the physical form is used as an example. The screen switching module may determine, based on the physical form corresponding to each shaft reported by the sensor service and reporting time, time at which the physical form corresponding to each shaft changes. The screen switching module may determine, based on the time at which the physical form corresponding to each shaft changes, whether the first shaft and the second shaft whose folding angles change simultaneously exist.

[0152] S7042: The screen switching module performs independent calculation based on folding angles and physical forms that correspond to the first shaft and the second shaft, to determine the display mode.

[0153] When folding angles or physical forms corresponding to a plurality of shafts do not change simultaneously, it indicates that the user sequentially operates shafts to change the physical form of the foldable screen device. In this scenario, the foldable screen device may sequentially respond to operations performed by the user on the shafts, and control screen areas corresponding to the shafts to be on or blank.

[0154] In this embodiment of this application, for the first shaft, for example, at a first moment, when the folding angle and the physical form that correspond to the first shaft change, the folding angle and the physical form that correspond to the second shaft do not change, and the screen switching module may determine the display mode based on the folding angle and the physical form that correspond to each shaft (including the folding angle

and the physical form that correspond to the first shaft at the first moment, and the folding angle and the physical form that correspond to the second shaft at the first moment) in the foldable screen device, and the mapping relationship.

[0155] Similarly, for the second shaft, for example, at a second moment, when the folding angle and the physical form that correspond to the second shaft change, the folding angle and the physical form that correspond to the first shaft start to change, and the screen switching module may determine the display mode based on the folding angle and the physical form that correspond to each shaft (including the folding angle and the physical form that correspond to the first shaft at the second moment, and the folding angle and the physical form that correspond to the second shaft at the first moment) in the foldable screen device, and the mapping relationship.

[0156] For example, the dual-shaft foldable screen device may include a shaft 1 and a shaft 2. The shaft 1 corresponds to a first screen area and a second screen area, and the shaft 2 corresponds to the second screen area and a third screen area. An unfolding process of the dual-shaft foldable screen device is used as an example. When the user first operates the shaft 1 and then operates the shaft 2 to unfold the foldable screen device, the screen switching module may detect that folding angles and physical forms that correspond to the shaft 1 and the shaft 2 do not change simultaneously. It should be understood that, when the folding angle and the physical form that correspond to the shaft 1 start to change, the screen switching module may determine the display mode based on the folding angles and the physical forms that correspond to the shaft 1 and the shaft 2. Similarly, when the folding angle and the physical form that correspond to the shaft 2 start to change, the screen switching module may determine the display mode based on the folding angles and the physical forms that correspond to the shaft 1 and the shaft 2. The following uses two moments in the unfolding process of the dual-shaft foldable screen device as an example to describe a process in which the screen switching module performs independent calculation based on the folding angles and the physical forms that correspond to the first shaft and the second shaft, to determine the display mode.

[0157] For example, at a first moment, the user operates to unfold the folding angle corresponding to the shaft 1 to a preset angle, the screen switching module may determine the display mode based on a folding angle and a physical form that correspond to each shaft at the first moment (for example, a folding angle and a physical form that correspond to the shaft 1 at the first moment, and a folding angle and a physical form that correspond to the shaft 2 at the first moment). For example, at a second moment, the user operates to unfold the folding angle corresponding to the shaft 2 to a preset angle, the screen switching module may determine the display mode based on a folding angle and a physical form that correspond to each shaft at the second moment (for example,

a folding angle and a physical form that correspond to the shaft 1 at the second moment, and a folding angle and a physical form that correspond to the shaft 2 at the second moment).

[0158] The following steps in FIG. 7C-1 and FIG. 7C-2 may be performed for both the display mode determined by the screen switching module at the first moment and the display mode determined by the screen switching module at the second moment.

[0159] S7043: The screen switching module determines, based on the folding angle corresponding to the first shaft, whether the first shaft is in a half-folding critical state. If the first shaft is not in the half-folding critical state, S7044 is performed; or if the first shaft is in the half-folding critical state, S7045 is performed.

[0160] The user operates a plurality of shafts simultaneously. When folding angles or physical forms corresponding to the plurality of shafts change simultaneously, and screen areas corresponding to the shafts overlap, a status of an overlapped screen area is affected by the plurality of shafts.

[0161] For example, the dual-shaft foldable screen device may include a shaft 1 and a shaft 2. The shaft 1 corresponds to a first screen area and a second screen area, and the shaft 2 corresponds to the second screen area and a third screen area. An unfolding process of the dual-shaft foldable screen device is used as an example. When the user simultaneously operates the shaft 1 and the shaft 2 to unfold the foldable screen device, the user requires that the first screen area, the second screen area, and the third screen area be all on.

[0162] When the user simultaneously operates the shaft 1 and the shaft 2 to unfold the foldable screen device, folding angles and physical forms that correspond to the shaft 1 and the shaft 2 may change simultaneously. However, due to a reason like an operation habit of the user, time at which the folding angle corresponding to the shaft 1 reaches a preset angle is different from time at which the folding angle corresponding to the shaft 2 reaches the preset angle. For example, at a first moment, the user operates to unfold the folding angle corresponding to the shaft 1 to the preset angle, and the display mode indicates that the first screen area is on and the second screen area is on. At a second moment, the user operates to unfold the folding angle corresponding to the shaft 2 to the preset angle, and the display mode indicates that the second screen area is on and the third screen area is on. The first moment is earlier than the second moment.

[0163] According to current screen control logic, when the folding angles and the physical forms that correspond to the shaft 1 and the shaft 2 change simultaneously, in response to an operation of the user, the foldable screen device may first control the first screen area and the second screen area to be on at the first moment, and then control the third screen area to be on at the second moment. In a process in which the foldable screen device is unfolded, before the first screen area is on, the second

screen area is on, and the third screen area is on, there is a process of "the first screen area is on, the second screen area is first on, and the third screen area is blank".

[0164] In this scenario, in a process in which the user operates the shaft 1 and the shaft 2 simultaneously to unfold the foldable screen device, the user requires that the first screen area, the second screen area, and the third screen area be on. However, the user perceives that there is a screen jump, to be specific, the first screen area is on, the second screen area is first on, and the third screen area is blank. Then, the first screen area is on, the second screen area is on, and the third screen area is on. Consequently, user experience is poor.

[0165] In this embodiment of this application, to accurately control the screen area and improve user experience, the screen switching module may first determine, based on the physical form of the first shaft, whether the first shaft is in the half-folding critical state.

[0166] The half-folding critical state may be understood as a predefined folding angle range. For example, the folding angle range may be 80° to 130°. In this embodiment of this application, the screen switching module may determine, based on whether the folding angle corresponding to the first shaft is within the folding angle range, whether the first shaft is in the half-folding critical state. When the folding angle corresponding to the first shaft is within the folding angle range, the screen switching module determines that the first shaft is in the half-folding critical state. When the folding angle corresponding to the first shaft is not within the folding angle range, the screen switching module determines that the first shaft is not in the half-folding critical state, or the first shaft is in a non-half-folding critical state.

[0167] When the first shaft is in the half-folding critical state, the user folds or unfolds the first shaft, and a status of a screen area corresponding to the first shaft changes in a short time (for example, a preset time). For example, the screen area is switched from a screen-on state to a blank screen state, or is switched from a blank screen state to a screen-on state. When the first shaft is not in the half-folding critical state, in other words, when the first shaft is in the non-half-folding critical state, even if the user folds or unfolds the first shaft, a status of a screen area corresponding to the first shaft does not change in a short time (for example, a preset time). For example, the screen is always on or blank.

[0168] An objective of setting the half-folding critical state in this embodiment of this application is as follows: In a scenario in which the first shaft and the second shaft are simultaneously operated (that is, the folding angles or the physical forms corresponding to the first shaft and the second shaft change simultaneously), whether the status of the screen area corresponding to the first shaft changes within the preset time may be predicted based on the half-folding critical state because a speed at which the user folds or unfolds the foldable screen device cannot be determined. The screen switching module may determine, based on a prediction result of "whether

the status of the screen area corresponding to the first shaft changes within the preset time", the display mode by using a corresponding method.

[0169] For example, when the first shaft is not in the half-folding critical state, the status of the screen area corresponding to the first shaft does not change within the preset time, and no screen jump occurs in a scenario in which the user simultaneously operates a plurality of shafts. In this scenario, the screen switching module may perform comprehensive calculation based on the folding angle and the physical form that correspond to each shaft, to determine the display mode. For details, refer to the description in S7044.

[0170] For example, when the first shaft is in the half-folding critical state, the status of the screen area corresponding to the first shaft changes within the preset time, and a screen jump occurs in a scenario in which the user simultaneously operates a plurality of shafts. In this scenario, in response to the folding angle and the physical form that are of the first shaft, the screen switching module may first skip determining the display mode, because after the display mode is determined, the foldable screen device responds based on the display mode, and a screen jump occurs. In this embodiment of this application, the user operates the first shaft and the second shaft simultaneously, the first shaft is in the half-folding critical state, and the second shaft may also reach the half-folding critical state in a short time. Therefore, the screen switching module may perform comprehensive calculation based on the folding angle and the physical form that are of the second shaft, to avoid a screen jump. For details, refer to the description in S7045.

[0171] In some embodiments, in a plurality of shafts whose folding angles and physical forms change simultaneously, a primary shaft may be used as the first shaft, and a secondary shaft may be used as the second shaft. The primary shaft and the secondary shaft may be pre-determined. For example, the primary shaft may be a shaft with a highest user operation frequency. It may be understood that, in some embodiments, the primary shaft, a secondary shaft 1, a secondary shaft 2, and the like may be determined based on user operation frequencies. During calculation in S7045, calculation is also performed in a sequence of the primary shaft, the secondary shaft 1, the secondary shaft 2, and the like.

[0172] In some embodiments, the first shaft may alternatively be a shaft that first meets a "condition for triggering a status change of a screen area". The folding angle and the physical form that correspond to the first shaft meet the condition for triggering the status change of the screen area. For example, if the folding angle corresponding to the first shaft reaches a preset angle, a corresponding screen area may be triggered to be blank or on. Alternatively, if the folding angle corresponding to the first shaft is folded to 0 degrees, the corresponding screen area may be triggered to be blank.

[0173] S7044: The screen switching module performs

comprehensive calculation based on the folding angle and the physical form that correspond to each shaft, to determine the display mode.

[0174] When the first shaft is not in the half-folding critical state, the status of the screen area corresponding to the first shaft does not change within the preset time, and no screen jump occurs in a scenario in which the user simultaneously operates a plurality of shafts. In this scenario, the screen switching module may perform comprehensive calculation based on the folding angle and the physical form that correspond to each shaft, to determine the display mode. For example, the screen switching module may determine the display mode based on the folding angle and the physical form that correspond to each shaft, and the mapping relationship.

[0175] S7045: When the folding angle and the physical form that correspond to the second shaft meet the condition for triggering the status change of the screen area, the screen switching module determines the display mode based on the folding angle and the physical form that correspond to each shaft.

[0176] When the first shaft is in the half-folding critical state, the status of the screen area corresponding to the first shaft changes within the preset time, and a screen jump occurs in a scenario in which the user simultaneously operates a plurality of shafts. In this scenario, in response to the folding angle and the physical form that are of the first shaft, the screen switching module may first skip determining the display mode, because after the display mode is determined, the foldable screen device responds based on the display mode, and a screen jump occurs. In this embodiment of this application, the screen switching module may wait, and when the folding angle and the physical form that correspond to the second shaft meet the condition for triggering the status change of the screen area, the screen switching module determines the display mode based on the folding angle and the physical form that correspond to each shaft.

[0177] For example, the dual-shaft foldable screen device may include a shaft 1 and a shaft 2. The shaft 1 corresponds to a first screen area and a second screen area, and the shaft 2 corresponds to the second screen area and a third screen area. An unfolding process of the dual-shaft foldable screen device is used as an example. When the user operates the shaft 1 and the shaft 2 to unfold the foldable screen device simultaneously, folding angles and physical forms that correspond to the shaft 1 and the shaft 2 may change simultaneously.

[0178] For example, at a first moment, the user operates to unfold the folding angle corresponding to the shaft 1 to the preset angle, and the display mode indicates that the first screen area is on and the second screen area is on. At a second moment, the user operates to unfold the folding angle corresponding to the shaft 2 to the preset angle, and the display mode indicates that the second screen area is on and the third screen area is on. The first moment is earlier than the second moment.

[0179] In this embodiment of this application, at the first

moment, the screen switching module may determine, based on the folding angle corresponding to the shaft 1, that the shaft 1 is in the half-folding critical state. The screen switching module may first skip determining the display mode (for example, the first screen area is on, and the second screen area is on) based on the folding angle and the physical form that correspond to each shaft at the first moment. At the second moment, the folding angle and the physical form that correspond to the shaft 2 meet a condition for triggering the status change of the screen area. For example, the folding angle and the physical form that correspond to the shaft 2 may trigger the second screen area to be on and the third screen area to be on. Therefore, the screen switching module may determine the display mode at the second moment based on the folding angle and the physical form that correspond to each shaft. It should be understood that at the second moment, the folding angle corresponding to the first shaft is greater than or equal to the preset angle, and the folding angle corresponding to the second shaft is unfolded to the preset angle. The display mode indicates that the first screen area is on, the second screen area is on, and the third screen area is on.

[0180] In this embodiment of this application, when the folding angles and the physical forms that correspond to the shaft 1 and the shaft 2 change simultaneously, in response to the operation of the user, the foldable screen device may simultaneously control the first screen area, the second screen area, and the third screen area to be on at the second moment, so as to avoid a screen jump, and improve user experience.

[0181] In this embodiment of this application, the screen switching module may determine whether the first shaft and the second shaft whose folding angles or physical forms change simultaneously exist. When the first shaft and the second shaft that change simultaneously do not exist, the user independently operates the shafts, and the screen switching module may sequentially respond to the operations of the user to determine the display mode, so as to enable the foldable screen device to control the status of the corresponding screen area. When the first shaft and the second shaft that change simultaneously exist, if the first shaft is not in the half-folding critical state, the screen switching module may determine the display mode based on the folding angle and the physical form that correspond to each shaft. If the first shaft is in the half-folding critical state, the screen switching module may wait, and when the folding angle and the physical form that correspond to the second shaft meet the condition for triggering the status change of the screen area, the screen switching module determines the display mode based on the folding angle and the physical form that correspond to each shaft. This can improve precision of screen control.

[0182] The foregoing embodiment describes a process in which the screen switching module determines the display mode. The following describes the screen control method in embodiments of this application by

using two examples of the display mode as examples.

[0183] Example 1: When a foldable screen device switches from a first physical form to a second physical form, the first screen area is switched from a screen-on state to a blank screen state, and the second screen area is switched from a blank screen state to a screen-on state. Correspondingly, in S7042, S7044, or S7045, the display mode may indicate that the first screen area is switched from the screen-on state to the blank screen state, and the second screen area is switched from the blank screen state to the screen-on state.

[0184] When the first screen area is on, a liquid crystal layer corresponding to the first screen area is in a power-on state, and a backlight panel corresponding to the first screen area is in a power-on state. When the second screen area is blank, the second screen area is in a power-off state. A liquid crystal layer corresponding to the second screen area is in a power-off state, and a backlight panel corresponding to the second screen area is in a power-off state.

[0185] In Example 1, the first screen area and the second screen area belong to a same physical screen. When the foldable screen device is in a first physical state, a part of screen areas on the physical screen is in a power-on state, and a part of screen areas is in a power-off state.

[0186] In Example 1, as shown in FIG. 7C-1 and FIG. 7C-2, after S704, the screen control method provided in this embodiment of this application may further include the following steps. It should be understood that specific steps in S701 to S704 are not shown in FIG. 7C-1 and FIG. 7C-2. For details, refer to the descriptions in FIG. 7A.

[0187] S705: A screen switching module sends a first display mode to a DMS, where the first display mode indicates that the first screen area is switched from the screen-on state to the blank screen state, and the second screen area is switched from the blank screen state to the screen-on state.

[0188] For S705, refer to the description in step 5 in the foregoing embodiment.

[0189] In some embodiments, the DMS may store a third display mode from the screen switching module last time. When the DMS receives the first display mode, the DMS may determine a status of the screen area based on the third display mode stored last time. For example, the third display mode indicates that the first screen area is on and the second screen area is blank. The DMS may determine that the first screen area is in the power-on state and the second screen area is in the power-off state.

Therefore, the DMS may determine that a part of screen areas in the physical screen is in the power-on state, and a part of screen areas is in the power-off state. The DMS determines that the entire physical screen does not need to be powered on first, and the DMS may perform S706.

[0190] In some embodiments, after receiving the third display mode last time, the DMS may control, via an SF, a HWC, and a display driver, the first screen area to be on and the second screen to be blank. For this step, refer to

related descriptions in FIG. 7C-1 and FIG. 7C-2. After controlling the first screen area to be on and the second screen to be blank, a display area may synchronize, with the DMS and the SF, information indicating that the first screen area is in the power-on state and the second screen area is in the power-off state. Both the DMS and the SF may store the information indicating that "the first screen area is in the power-on state, and the second screen area is in the power-off state" in the third display mode.

[0191] In this embodiment, when the DMS receives the first display mode, the DMS may determine, based on the stored information, that the first screen area is in the power-on state and the second screen area is in the power-off state. Therefore, the DMS may determine that a part of screen areas in the physical screen is in the power-on state, and a part of screen areas is in the power-off state. The DMS determines that the entire physical screen does not need to be powered on first, and the DMS may perform S706.

[0192] S706: The DMS sends the first display mode to a WMS.

[0193] S707: The WMS performs a screen freezing operation.

[0194] The screen freezing operation may be understood as: pausing sending a drawn window for display via the SF. Otherwise, the WMS draws a window while the SF simultaneously sends the window for display, and a user can view a drawing process in the screen area. The user feels that artifacts occur, and user experience is affected. In this embodiment of this application, an objective of performing the screen freezing operation by the WMS is to perform operations such as window rendering, layer composition, and sending for display after the WMS completes window drawing. In this way, the user sees a complete window in the screen area instead of a process of drawing the window.

[0195] S708: The WMS draws a window based on the second screen area.

[0196] In response to the first display mode, the WMS may determine that a screen area to be on is the second screen area. The WMS may draw the window based on a size of the second screen area. The window drawing operation may include but is not limited to: determining a size of the window, a location of the window in the second screen area, and the like.

[0197] S709: The WMS performs an unfreezing operation.

[0198] After the WMS draws the window, the unfreezing operation may be performed. Unfreezing means that operations such as window rendering, layer composition, and sending for display can continue to be performed.

[0199] S710: In response to the unfreezing operation of the WMS, the DMS sends first information to the SF, where the first information indicates to switch a display area and power off the first screen area.

[0200] In some embodiments, after performing the unfreezing operation, the WMS may notify the DMS,

so that the DMS sends the first information to the SF. This process is not shown in FIG. 7C-1 and FIG. 7C-2.

[0201] Refer to step 6. In the conventional technology, the DMS sends the display mode to the SF, to indicate the SF to switch a display area. The display area is switched, for example, the display area is switched from the first screen area to the second screen area.

[0202] In this embodiment of this application, the DMS may submit "switching a display area and powering off the screen area to be blank (the first screen area)" to the SF as an instruction. This can ensure that the screen area sent by the SF for display is consistent with a powered-on screen area, and the first screen area may be further powered off via the SF. In this way, the first screen area may be further powered off after the screen is blank, and the first screen area no longer consumes power, so that power consumption of the foldable screen device can be reduced.

[0203] In this embodiment of this application, the DMS may send the first information to the SF. The first information indicates to switch the display area. For example, the first information may include the first display mode. For example, the first display mode may include an identifier of a screen area to be blank (the first screen area) and an identifier of a screen area to be on (the second screen area). Based on the first information, the SF may determine that the display area is switched from the first screen area to the second screen area.

[0204] In this way, after obtaining a to-be-displayed image in the window, the SF may determine to send the image to the second screen area for display. In some embodiments, that the SF sends the image to the second screen area for display may be understood as follows: The SF sends the to-be-displayed image and the identifier of the second screen area to the HWC, and the HWC sends the to-be-displayed image and the identifier of the second screen area to the display driver. The display driver may drive the second screen area to display the image.

[0205] The first information further indicates to power off the screen area to be blank, that is, indicates to power off the first screen area. For example, the first information may further include an instruction for powering off the first screen area.

[0206] S711: The SF determines whether the physical screen is in the power-on state. If the physical screen is in the power-on state, S712 is performed; or if the physical screen is not in the power-on state, S713 is performed.

[0207] In response to the first information, the SF may determine whether the physical screen is in the power-on state. The physical screen is a physical screen to which the first screen area and the second screen area belong.

[0208] In some embodiments, a display mode in the first information sent by the DMS to the SF last time may be used as the third display mode. The SF may store the third display mode, and the SF may determine the status of the screen area based on the third display mode stored last time. For example, the third display mode indicates

that the first screen area is on and the second screen area is blank. The SF may determine, based on the third display mode, that the first screen area is in the power-on state and the second screen area is in the power-off state. Therefore, the SF may determine that a part of screen areas of the physical screen to which the first screen area and the second screen area belong is in the power-on state, a part of screen areas is in the power-off state, and the physical screen is in the power-on state.

[0209] In some embodiments, the SF may store information indicating that "the first screen area is in the power-on state and the second screen area is in the power-off state" in the third mode. For details, refer to the description in S705. In this embodiment, the SF may determine, based on the stored information, that the first screen area is in the power-on state and the second screen area is in the power-off state. Therefore, the SF may determine that a part of screen areas of the physical screen to which the first screen area and the second screen area belong is in the power-on state, a part of screen areas is in the power-off state, and the physical screen is in the power-on state.

[0210] S712: The SF sends second information to the HWC, where the second information indicates to switch a display area and power off the first screen area.

[0211] In some embodiments, the second information may include content in the first information. In this way, the second information indicates to switch the display area and power off the first screen area. In some embodiments, the second information may further include a to-be-displayed image. In other words, the SF may include the to-be-displayed image in the first information, to obtain the second information.

[0212] S713: The SF stops sending for display, and stops switching the display area.

[0213] When the physical screen is in the power-off state, the physical screen cannot display an image, and the SF may not send the second information to the HWC. In other words, when the physical screen is in the power-off state, the SF may stop sending for display, and stop switching the display area. That the SF stops sending for display may be understood as that the SF does not send the to-be-displayed image to the HWC. That the SF stops switching the display area may be understood as that the SF does not send the content in the first information to the HWC.

[0214] S714: The HWC forwards the second information to the display driver.

[0215] S715: The display driver drives the second screen area to be on, displays an image in the second screen area, drives the first screen area to be blank, and controls the first screen area to be powered off.

[0216] In response to the second information, the display driver may determine that the first screen area is switched from the screen-on state to the blank screen state, and the second screen area is switched from the blank screen state to the screen-on state. The display driver may drive the second screen area to be on, display

the image in the second screen area, drive the first screen area to be blank, and control the first screen area to be powered off.

[0217] When the second screen area is in the blank screen state, the second screen area is in the power-off state, and both the backlight panel and the liquid crystal layer that correspond to the second screen area are in the power-off state. That the display driver drives the second screen area to be on may be understood as that the display driver drives the backlight panel and the liquid crystal layer that correspond to the second screen area to be powered on.

[0218] In some embodiments, a liquid crystal layer corresponding to each screen area may correspond to one group of drive circuits. In this embodiment, when the first screen area is in the screen-on state, both the backlight panel and the liquid crystal layer that correspond to the first screen area are in the power-on state. That the display driver drives the first screen area to be blank and controls the first screen area to be powered off may include the following cases:

(1) That the display driver drives the first screen area to be blank may be understood as follows: The display driver controls a drive circuit corresponding to the first screen area, so that the drive circuit adjusts the liquid crystal layer to completely block the backlight panel, light emitted by the backlight panel cannot penetrate the liquid crystal layer, and the first screen area presents a blank screen. When the first screen area is blank, both the backlight panel and the liquid crystal layer that correspond to the first screen area are in the power-on state.

In this case, that the display driver controls the first screen area to be powered off may be understood as that the display driver controls the backlight panel and the liquid crystal layer that correspond to the first screen area to be powered off. For example, the display driver may turn off the drive circuit corresponding to the first screen area, so that the drive circuit cannot drive the liquid crystal layer, and the liquid crystal layer is in the power-off state.

(2) That the display driver drives the first screen area to be blank may be understood as follows: The display driver controls the backlight panel corresponding to the first screen area to be powered off. When the backlight panel is powered off, the backlight panel does not emit light, and the first screen area is blank. In this case, the liquid crystal layer corresponding to the first screen area is in the power-on state.

[0219] In this case, that the display driver controls the first screen area to be powered off may be understood as that the display driver controls the liquid crystal layer in the first screen area to be powered off. For example, the display driver turns off the drive circuit corresponding to the first screen area, so that the drive circuit cannot drive

the liquid crystal layer.

[0220] In some embodiments, a liquid crystal layer corresponding to each screen area may correspond to a drive circuit, the drive circuit corresponds to a group of switches, the drive circuit is connected to a power supply via the group of switches, and the power supply is configured to supply power to the drive circuit.

[0221] In this embodiment, when the first screen area is in the screen-on state, both the backlight panel and the liquid crystal layer that correspond to the first screen area are in the power-on state. That the display driver drives the first screen area to be blank and controls the first screen area to be powered off may include the following cases:

(1) That the display driver drives the first screen area to be blank may be understood as follows: The display driver controls a drive circuit corresponding to the first screen area, so that the drive circuit adjusts the liquid crystal layer to completely block the backlight panel, light emitted by the backlight panel cannot penetrate the liquid crystal layer, and the first screen area presents a blank screen. When the first screen area is blank, both the backlight panel and the liquid crystal layer that correspond to the first screen area are in the power-on state.

In this case, that the display driver controls the first screen area to be powered off may be understood as that the display driver controls the backlight panel and the liquid crystal layer in the first screen area to be powered off. For example, the display driver turns off a switch corresponding to the first screen area, so that the power supply cannot supply power to the drive circuit, and the drive circuit cannot drive the liquid crystal layer.

(2) That the display driver drives the first screen area to be blank may be understood as follows: The display driver controls the backlight panel corresponding to the first screen area to be powered off. When the backlight panel is powered off, the backlight panel does not emit light, and the first screen area is blank. In this case, the liquid crystal layer corresponding to the first screen area is in the power-on state.

[0222] In this case, that the display driver controls the first screen area to be powered off may be understood as that the display driver controls the liquid crystal layer in the first screen area to be powered off. For example, the display driver turns off a switch corresponding to the first screen area, so that the power supply cannot supply power to the drive circuit, and the drive circuit cannot drive the liquid crystal layer.

[0223] In some embodiments, the backlight panel corresponding to the screen area in the physical screen may also correspond to a drive circuit, or the drive circuit may correspond to a group of switches. For a process in which the display driver controls the backlight panel corre-

sponding to the screen area to be powered off, refer to the foregoing description of "the display driver controls the liquid crystal layer corresponding to the screen area to be powered off".

[0224] In this embodiment of this application, in a process in which the physical form of the foldable screen device changes, the first screen area may be switched from the screen-on state to the blank screen state. After controlling the first screen area to be blank, the foldable screen device may further control the first screen area to be powered off. In this way, no power is consumed after the first screen area is blank, power consumption of the foldable screen device is reduced, and standby duration is increased.

[0225] Example 2: When a physical screen is in a screen-off state, an entire physical screen is in a power-off state. In this example, when a foldable screen device switches from a third physical form to a fourth physical form, a first screen area may be switched from a blank screen state to a screen-on state, and a second screen area is blank. For example, the third physical form may be, for example, a folded state.

[0226] In Example 2, in a process in which the foldable screen device switches from the third physical form to the fourth physical form, the foldable screen device may perform S701 to S704. In S7042, S7044, or S7045, the display mode may indicate that the first screen area is switched from the blank screen state to the screen-on state, and the second screen area is the blank screen. Because the physical screen is in the power-off state, in this embodiment of this application, the physical screen may be powered on first, to ensure subsequent processing on the screen area to be on or blank.

[0227] In Example 2, as shown in FIG. 7D-1 and FIG. 7D-2, after S704, the screen control method provided in this embodiment of this application may further include the following steps. It should be understood that specific steps in S701 to S704 are not shown in FIG. 7D-1 and FIG. 7D-2. For details, refer to the descriptions in FIG. 7A.

[0228] S705A: A screen switching module sends a second display mode to a DMS, where the second display mode indicates that the first screen area is switched from the blank screen state to the screen-on state, and the second screen area is blank.

[0229] For S705A, refer to the description in S705 in the foregoing embodiment.

[0230] S706A: In response to the second display mode, the DMS sends a power-on instruction to a wake-up power.

[0231] Refer to the description in S706. The DMS may determine a status of each screen area and a power-on/off state of the physical screen before the second display mode is received.

[0232] For example, the physical screen of the foldable screen includes a first screen area and a second screen area. In some embodiments, the DMS may store a fourth display mode from the screen switching module last time. When the DMS receives the second display mode, the

DMS may determine the status of the screen area based on the fourth display mode stored last time. For example, the fourth display mode indicates that the first screen area is blank and the second screen area is blank. The DMS may determine that the first screen area is in a power-off state and the second screen area is in a power-off state. Therefore, the DMS may determine that all screen areas on the physical screen are in the power-off state, that is, the entire physical screen is in the power-off state, and the DMS determines that the entire physical screen needs to be powered on first.

[0233] In some embodiments, after receiving the fourth display mode last time, the DMS may control, via an SF, a HWC, and a display driver, the first screen area to be blank and the second screen to be blank. For this step, refer to related descriptions in FIG. 7C-1 and FIG. 7C-2. After controlling the first screen area to be blank and the second screen to be blank, a display area may synchronize, with the DMS and the SF, information indicating that the first screen area is in the power-off state and the second screen area is in the power-off state. Both the DMS and the SF may store the information indicating that "the first screen area is in the power-off state, and the second screen area is in the power-off state" in the fourth display mode.

[0234] In this embodiment, when the DMS receives a first display mode, the DMS may determine, based on the stored information, that the first screen area is in the power-off state and the second screen area is in the power-off state. Therefore, the DMS may determine that all screen areas on the physical screen are in the power-off state, that is, the entire physical screen is in the power-off state, and the DMS determines that the entire physical screen needs to be powered on first.

[0235] When the DMS determines to power on the physical screen, the DMS may send the power-on instruction to the wake-up power, where the power-on instruction instructs to control the physical screen to be powered on.

[0236] S707A: The wake-up power controls the physical screen to be powered on.

[0237] In some embodiments, a process in which the wake-up power controls the physical screen to be powered on may include the following (1) to (5):

- (1) The wake-up power sends acknowledgment information to the DMS, where the acknowledgment information indicates that the wake-up power receives the power-on instruction.
- (2) The DMS invokes a power-on/off interface of the SF, and sends the power-on instruction to the SF.
- (3) The SF sends the power-on instruction to the HWC.
- (4) The HWC sends the power-on instruction to the display driver.
- (5) The display driver controls the physical screen to be powered on.

[0238] In some embodiments, when the display driver controls the physical screen to be powered on, the display driver may synchronize a power-on state of the physical screen with the SF.

[0239] In some embodiments, that the display driver controls the physical screen to be powered on means that the display driver controls a backlight panel corresponding to the physical screen to be powered on, controls a liquid crystal layer corresponding to the physical screen to be powered on, and controls the liquid crystal layer to completely block the backlight panel, so that light emitted by the backlight panel cannot penetrate the liquid crystal layer, and the physical screen presents a blank screen.

[0240] For example, the physical screen includes the first screen area and the second screen area. That the display driver controls the physical screen to be powered on specifically means that the display driver controls a backlight panel and a liquid crystal layer corresponding to the first screen area to be powered on, controls the liquid crystal layer corresponding to the first screen area to completely block light emitted by the backlight panel, controls a backlight panel and a liquid crystal layer corresponding to the second screen area to be powered on, and controls the liquid crystal layer corresponding to the second screen area to completely block light emitted by the backlight panel.

[0241] Herein, the first screen area is used as an example to describe a method in which the display driver controls the liquid crystal layer corresponding to the screen area to be powered on. The display driver may turn on a drive circuit corresponding to the first screen area, so that the drive circuit drives the liquid crystal layer to completely block light emitted by the backlight panel. Alternatively, the display driver turns on a switch corresponding to the first screen area, so that a power supply supplies power to the drive circuit, and the drive circuit may drive the liquid crystal layer to completely block light emitted by the backlight panel.

[0242] In some embodiments, the backlight panel corresponding to the first screen area in the physical screen may also correspond to a drive circuit, or the drive circuit may correspond to a group of switches. That the display driver controls the backlight panel corresponding to the screen area to be powered on may be understood as that the display driver turns on the drive circuit corresponding to the first screen area, or turns on a switch corresponding to the drive circuit, so that the drive circuit drives the backlight panel to be powered on.

[0243] In some embodiments, that the display driver controls the physical screen to be powered on means that the display driver controls the liquid crystal layer corresponding to the physical screen to be powered on, and the backlight panel corresponding to the physical screen to be in the power-off state.

[0244] For example, the physical screen includes the first screen area and the second screen area. That the display driver controls the physical screen to be powered on specifically means that the display driver controls the

liquid crystal layer corresponding to the first screen area to be powered on, and the backlight panel corresponding to the first screen area to be in the power-off state; and the display driver controls the liquid crystal layer corresponding to the second screen area to be powered on, and the backlight panel corresponding to the second screen area to be in the power-off state.

[0245] S708A: The DMS sends the second display mode to a WMS.

[0246] S709A: The WMS draws a window based on the first screen area.

[0247] For S709A, refer to the description in S708.

[0248] In this scenario, after the physical screen is powered on, the physical screen is in the blank screen state, and the physical screen does not limit an animation drawn in the window. Therefore, the WMS does not need to perform a screen freezing operation, but directly draws the window based on the first screen area.

[0249] S710A: The DMS sends third information to the SF, where the third information indicates to switch a display area and power off the second screen area.

[0250] In this embodiment of this application, after the physical screen is powered on, each screen area on the physical screen is in the power-on state. For example, the first screen area is in the power-on state, and the second screen area is in the power-on state. However, the second display mode received by the DMS indicates that the first screen area is switched from the blank screen state to the screen-on state, and the second screen area is in the blank screen state. To reduce energy consumption generated by the second screen area, in this embodiment of this application, the second screen area may be controlled to be powered off.

[0251] For the third information, refer to the description of the first information. For example, the third information may include the second display mode and an instruction instructing to power off the second screen area.

[0252] S711A: The SF determines whether the physical screen is in the power-on state. If the physical screen is in the power-on state, S712A is performed; or if the physical screen is not in the power-on state, S713A is performed.

[0253] In S707A, when the wake-up power controls the physical screen to be powered on, the display driver may synchronize the power-on state of the physical screen with the SF, and the SF may store the power-on state of the physical screen. Based on this, the SF may determine that the physical screen is in the power-on state.

[0254] S712A: The SF sends fourth information to the HWC, where the fourth information indicates to switch the display area.

[0255] For the fourth information, refer to the description of the second information. In some embodiments, the fourth information may include content in the third information and a to-be-displayed image generated by the SF.

[0256] S713A: The SF stops sending for display, and stops switching the display area.

[0257] S714A: The HWC forwards the fourth informa-

tion to the display driver.

[0258] For S712A to S714A, refer to the descriptions in S712 to S714.

[0259] S715A: The display driver drives the first screen area to be on and display an image, and controls the second screen area to be powered off.

[0260] According to the description in S707A, in some embodiments, when the physical screen is in the power-on state, both the backlight panel and the liquid crystal layer that correspond to the first screen area are in the power-on state, and the display driver may control the liquid crystal layer corresponding to the first screen area to transmit light emitted by the backlight panel, to display an image in the first screen area. In this embodiment, when the physical screen is in the power-on state, both the backlight panel and the liquid crystal layer that correspond to the second screen area are in the power-on state, and the display driver may control the second screen area to be powered off. That the display driver controls the second screen area to be powered off means that the display driver controls the backlight panel and the liquid crystal layer that correspond to the second screen area to be powered off.

[0261] In some embodiments, when the physical screen is in the power-on state, the backlight panel corresponding to the first screen area is in the power-off state, and the liquid crystal layer corresponding to the first screen area is in the power-on state. The display driver may control the backlight panel corresponding to the first screen area to be powered on, and control the liquid crystal layer corresponding to the first screen area to transmit light emitted by the backlight panel, to display an image in the first screen area. In this embodiment, when the physical screen is in the power-on state, the backlight panel corresponding to the second screen area is in the power-off state, the liquid crystal layer corresponding to the second screen area is in the power-on state, and the display driver may control the second screen area to be powered off. That the display driver controls the second screen area to be powered off means that the display driver controls the liquid crystal layer corresponding to the second screen area to be powered off.

[0262] In this embodiment of this application, when a physical form of the foldable screen device is switched from the third physical form to the fourth physical form, for example, the foldable screen device is unfolded from the folded state. When the foldable screen device is in the third physical form (for example, the folded state), the physical screen of the foldable screen device is in the power-off state. Therefore, in a process in which the foldable screen device is unfolded from the folded state, the physical screen may be first controlled to be powered on, to ensure that a screen area on the physical screen can be on subsequently. On the basis of powering on the physical screen, the first screen area is controlled to switch from the blank screen state to the screen-on state, and the second screen area that remains in the blank

screen state is powered off. This can also reduce power consumption of the screen area in the blank screen state.

[0263] In the foregoing embodiment, the screen control method provided in embodiments of this application is described from a perspective of interaction between internal modules of the foldable screen device. The following describes the screen control method provided in embodiments of this application from a perspective of the foldable screen device. Refer to FIG. 8. The screen control method provided in embodiments of this application may include the following steps.

[0264] S801: When a foldable screen device is in a first physical form, a first screen area is on, and a second screen area is blank.

[0265] S802: In response to switching from the first physical form to a second physical form, control the second screen area to be on, control the first screen area to be blank, and control the first screen area to be powered off.

[0266] In this embodiment of this application, for example, the foldable screen device includes a first physical screen, and the first physical screen includes the first screen area and the second screen area. When a physical form of the foldable screen device changes, after controlling the first screen area to be blank, the foldable screen device may further control the first screen area to be powered off, and powering off the first screen area does not consume power, so that power consumption of the foldable screen device can be reduced, and standby duration can be increased.

[0267] In this embodiment of this application, the foldable screen device may include at least one physical screen, and the first physical screen is included in the at least one physical screen. The first physical screen may be divided into a plurality of screen areas, and any two screen areas do not overlap. The first screen area is included in the plurality of screen areas.

[0268] The first physical screen is a liquid crystal display, and the liquid crystal display includes a backlight panel and a liquid crystal layer. When the first screen area is on, the backlight panel corresponding to the first screen area is in a power-on state, and the liquid crystal layer corresponding to the first screen area is in a power-on state. That the foldable screen device controls the first screen area to be blank may include the following two cases:

(1) The foldable screen device controls the backlight panel corresponding to the first screen area to be powered off. The backlight panel corresponding to the first screen area is powered off, the backlight panel corresponding to the first screen area does not emit light, and the first screen area is blank.

(2) The backlight panel corresponding to the first screen area is in the power-on state, and the liquid crystal layer corresponding to the first screen area is in the power-on state. The foldable screen device controls a drive circuit corresponding to the liquid

crystal layer, to adjust the liquid crystal layer to completely block light from the backlight panel, so that the light from the backlight panel cannot be transmitted, the first screen area is blank.

[0269] For the foregoing case (1), that the foldable screen device controls the first screen area to be powered off means that the foldable screen device controls the liquid crystal layer corresponding to the first screen area to be powered off. For the foregoing case (2), that the foldable screen device controls the first screen area to be powered off means that the foldable screen device controls both the backlight panel and the liquid crystal layer that correspond to the first screen area to be powered off.

[0270] For a manner in which the foldable screen device controls the liquid crystal layer corresponding to the first screen area to be powered off, refer to the descriptions in the foregoing embodiment.

[0271] Similarly, after the foldable screen device controls the first screen area to be blank and controls the first screen area to be powered off, in response to switching from the second physical form to the first physical form, the foldable screen device may control the first screen area to be powered on. When the first screen area is powered on, the first screen area is on. In this embodiment of this application, that the foldable screen device controls the first screen area to be powered on means that the foldable screen device controls the backlight panel and the liquid crystal layer that correspond to the first screen area to be powered on.

[0272] In some embodiments, the foldable screen device includes a plurality of shafts, and the foldable screen device may change a physical form through any shaft. In a process in which the foldable screen device switches from the first physical form to the second physical form, the foldable screen may determine a first display mode based on a folding angle corresponding to each shaft and a physical form corresponding to each shaft. The first display mode indicates that the first screen area is switched from the screen-on state to the blank screen state. The foldable screen device may control, based on the first display mode, the first screen area to be blank, and control the first screen area to be powered off.

[0273] For a method for determining the first display mode by the foldable screen device, refer to the descriptions in FIG. 7A and FIG. 7B.

[0274] In some embodiments, when the foldable screen device is in a third physical form, the first physical screen may be in a power-off state. For example, the first physical screen is off. For example, the third physical form may be a folded state. When the foldable screen device switches from the third physical form to a fourth physical form, the foldable screen device may determine a second display mode based on the folding angle corresponding to each shaft and the physical form corresponding to each shaft.

[0275] The second display mode indicates that the first

screen area is switched from the blank screen state to the screen-on state, and the second screen area is in the blank screen state. In this scenario, the foldable screen device may first control the first physical screen to be powered on, and then control the first screen area to be on. In addition, because the entire first physical screen is in the power-on state, to reduce power consumption of the screen, the foldable screen device may control the second screen area to be powered off.

[0276] For a method for determining the second display mode by the foldable screen device, refer to the descriptions in FIG. 7A and FIG. 7B.

[0277] It should be understood that FIG. 8 briefly describes the screen control method performed by the foldable screen device. For implementation details, refer to the descriptions in FIG. 7A to FIG. 7D-2.

[0278] It should be noted that data (including but not limited to data used for analysis, stored data, displayed data, and the like) in this application are information and data for which an authorization is obtained from a user or a full authorization is obtained from each party, and the collection, use, and processing of related data need to comply with related laws, regulations, and standards of related countries and regions. Corresponding operation entries are provided for the user to choose to authorize or deny.

[0279] In an embodiment, an embodiment of this application further provides a foldable screen device. Refer to FIG. 9. The foldable screen device may include a processor 901 (for example, a CPU) and a memory 902. The memory 902 may include a high-speed random-access memory (random-access memory, RAM), and may further include a non-volatile memory (non-volatile memory, NVM), for example, at least one magnetic disk memory. The memory 902 may store various instructions, to complete various processing functions and implement the steps of the methods in this application.

[0280] Optionally, the foldable screen device in this application may further include a power supply 903, a communication bus 904, and a communication port 905. The communication port 905 is configured to implement connection and communication between the foldable screen device and another peripheral. In embodiments of this application, the memory 902 is configured to store computer-executable program code, and the program code includes instructions. When the processor 901 executes the instructions, the instructions enable the processor 901 of the foldable screen device to perform the actions in the foregoing method embodiments. Implementation principles and technical effect thereof are similar to those in the foregoing method embodiments. Details are not described herein again.

[0281] Optionally, the foldable screen device in this application may further include a display 906. The display 906 is configured to display an interface of the foldable screen device.

[0282] Optionally, the foldable screen device in this

application may further include a first sensor 907 and a second sensor 908. For the first sensor 907, refer to the description of the first sensor in the foregoing embodiment. For the second sensor 908, refer to the description of the second sensor in the foregoing embodiment.

[0283] It should be noted that the modules or components in the foregoing embodiments may be configured as one or more integrated circuits for implementing the foregoing methods, for example, one or more application-specific integrated circuits (application-specific integrated circuit, ASIC), one or more digital signal processors (digital signal processor, DSP), or one or more field programmable gate arrays (field programmable gate array, FPGA). For another example, when one of the foregoing modules is implemented in a form of scheduling program code by a processing element, the processing element may be a general-purpose processor, for example, a central processing unit (central processing unit, CPU) or another processor that can call the program code, for example, a controller. For another example, the modules may be integrated together and implemented in a form of a system-on-a-chip (system-on-a-chip, SOC).

[0284] All or some of the foregoing embodiments may be implemented by using software, hardware, firmware, or any combination thereof. When software is used to implement the embodiments, all or a part of the embodiments may be implemented in a form of a computer program product. The computer program product includes one or more computer instructions. When the computer program instructions are loaded and executed on a computer, all or some of the procedures or functions according to embodiments of this application are generated. The computer may be a general-purpose computer, a dedicated computer, a computer network, or other programmable apparatuses. The computer instructions may be stored in a computer-readable storage medium or may be transmitted from a computer-readable storage medium to another computer-readable storage medium. For example, the computer instructions may be transmitted from a website, computer, server, or data center to another website, computer, server, or data center in a wired (for example, a coaxial cable, an optical fiber, or a digital subscriber line (DSL)) or wireless (for example, infrared, radio, or microwave) manner. The computer-readable storage medium may be any usable medium accessible by a computer, or a data storage device, such as a server or a data center, integrating one or more usable media. The usable medium may be a magnetic medium (for example, a floppy disk, a hard disk, or a magnetic tape), an optical medium (for example, a DVD), a semiconductor medium (for example, a solid state disk Solid State Disk (SSD)), or the like.

[0285] The term "a plurality of" in this specification refers to two or more. The term "and/or" in this specification describes only an association relationship for describing associated objects and represents that three relationships may exist. For example, A and/or B may represent the following three cases: Only A exists, both A

and B exist, and only B exists. In addition, a character "/" in this specification usually indicates an "or" relationship between associated objects, and a character "/" in a formula usually indicates a "divisible" relationship between associated objects. In addition, it should be understood that in description of this application, terms such as "first" and "second" are merely used for distinguishing and description, but should not be understood as indicating or implying relative importance, or should not be understood as indicating or implying a sequence.

[0286] It may be understood that various numbers in embodiments of this application are merely used for differentiation for ease of description, and are not used to limit the scope of embodiments of this application.

[0287] It should be understood that sequence numbers of the foregoing processes do not mean execution sequences in embodiments of this application. The execution sequences of the processes should be determined according to functions and internal logic of the processes, and should not be construed as any limitation on the implementation processes of embodiments of this application.

Claims

1. A screen control method applied to a foldable screen device, wherein the foldable screen device comprises a first physical screen, the first physical screen comprises a first screen area and a second screen area, and the method comprises:

when the foldable screen device is in a first physical form, the first screen area is on, and the second screen area is blank; and in response to switching from the first physical form to a second physical form, controlling the second screen area to be on, controlling the first screen area to be blank, and controlling the first screen area to be powered off.

2. The method according to claim 1, wherein the first physical screen is a liquid crystal display, the liquid crystal display comprises a backlight panel and a liquid crystal layer, and when the first screen area is on, the backlight panel corresponding to the first screen area is in a power-on state, and the liquid crystal layer corresponding to the first screen area is in a power-on state.

3. The method according to claim 2, wherein when the first screen area is blank, the backlight panel corresponding to the first screen area is in the power-on state, the liquid crystal layer corresponding to the first screen area is in the power-on state, and the liquid crystal layer completely blocks light from the backlight panel; and controlling the first screen area to be powered off

comprises:

controlling the backlight panel corresponding to the first screen area to be powered off, and controlling the liquid crystal layer corresponding to the first screen area to be powered off.

4. The method according to claim 2, wherein when the first screen area is blank, the backlight panel corresponding to the first screen area is in a power-off state, and the liquid crystal layer corresponding to the first screen area is in the power-on state; and controlling the first screen area to be powered off comprises:

controlling the liquid crystal layer corresponding to the first screen area to be powered off.

5. The method according to any one of claims 1 to 4, wherein the foldable screen device comprises a plurality of shafts, the foldable screen device implements a physical form change through any one of the shafts, and before controlling the second screen area to be on, controlling the first screen area to be blank, and controlling the first screen area to be powered off, the method further comprises: determining a first display mode based on a folding angle corresponding to each shaft and a physical form corresponding to each shaft, wherein the first display mode indicates that the first screen area is switched from a screen-on state to a blank screen state, and the second screen area is switched from a blank screen state to a screen-on state.

6. The method according to claim 5, wherein determining the first display mode based on the folding angle corresponding to each shaft and the physical form corresponding to each shaft comprises:

determining whether a first shaft and a second shaft whose folding angles or physical forms change simultaneously exist, wherein the first shaft and the second shaft are comprised in the plurality of shafts; and

if the first shaft and the second shaft whose folding angles or physical forms change simultaneously do not exist, determining the first display mode at a first moment based on the folding angle corresponding to each shaft and the physical form corresponding to each shaft, and determining the first display mode at a second moment based on the folding angle corresponding to each shaft and the physical form corresponding to each shaft, wherein the first moment is a moment at which the folding angle of the first shaft changes, and the second moment is a moment at which the folding angle of the second shaft changes.

7. The method according to claim 6, wherein when the

first shaft and the second shaft whose folding angles or physical forms change simultaneously exist, determining the first display mode based on the folding angle corresponding to each shaft and the physical form corresponding to each shaft comprises:

determining, based on the folding angle of the first shaft, whether the first shaft is in a half-folding critical state, wherein when the first shaft is in the half-folding critical state, the folding angle of the first shaft is within a folding angle range; and

if the first shaft is not in the half-folding critical state, determining the first display mode based on the folding angle corresponding to each shaft and the physical form corresponding to each shaft; or

if the first shaft is in the half-folding critical state, when the folding angle and the physical form that correspond to the second shaft meet a condition for triggering a status change of a screen area, determining the first display mode based on the folding angle and the physical form that correspond to each shaft.

8. The method according to any one of claims 1 to 7, wherein the method further comprises:

when the foldable screen device is in a third physical form, the first screen area is blank, the second screen area is blank, and the first physical screen is in a power-off state; in response to switching from the third physical form to a fourth physical form, controlling the first physical screen to be powered on; and controlling the first screen area to be on, and controlling the second screen area to be powered off.

9. The method according to claim 8, wherein the third physical form is in a folded state.

10. The method according to claim 9, wherein the foldable screen device comprises the plurality of shafts, the foldable screen device implements a physical form change through any shaft, and before controlling the first physical screen to be powered on, the method further comprises:

determining a second display mode based on the folding angle corresponding to each shaft and the physical form corresponding to each shaft, wherein the second display mode indicates that the first screen area is switched from the blank screen state to the screen-on state, and the second screen area remains in the blank screen state.

11. The method according to any one of claims 5 to 7, wherein the foldable screen device comprises a

sensor service and a screen switching module, and the method comprises:

reporting, by the sensor service to the screen switching module, the folding angle corresponding to each shaft and the physical form corresponding to each shaft; and determining the first display mode based on the folding angle corresponding to each shaft and the physical form corresponding to each shaft comprises:

determining, by the screen switching module, the first display mode based on the folding angle corresponding to each shaft and the physical form corresponding to each shaft.

12. The method according to claim 11, wherein the foldable screen device further comprises a display manager service DMS, a surface finger SF module, a hardware composer HWC, and a display driver, and after determining the first display mode, the method further comprises:

sending, by the screen switching module, the first display mode to the DMS;

sending, by the DMS, first information to the SF, wherein the first information comprises the first display mode, and the first information indicates to power off the first screen area;

sending, by the SF, second information to the HWC, wherein the second information comprises content of the first information;

forwarding, by the HWC, the second information to the display driver; and

controlling the second screen area to be on, controlling the first screen area to be blank, and controlling the first screen area to be powered off comprises:

controlling, by the display driver, the second screen area to be on, controlling the first screen area to be blank, and controlling the first screen area to be powered off.

13. The method according to claim 12, wherein the foldable screen device further comprises a window manager service WMS; and before sending, by the DMS, the first information to the SF, the method further comprises:

sending, by the DMS, the first display mode to the WMS;

performing, by the WMS, a screen freezing operation;

drawing, by the WMS, a window based on the second screen area;

performing, by the WMS, an unfreezing operation; and

sending, by the WMS, a drawn window to the SF;

the method further comprises:

performing, by the SF, layer composition on the window to obtain a to-be-displayed image, wherein the second information further comprises the image;
before sending, by the SF, the second information to the HWC, the method further comprises:

determining, by the SF, whether the first physical screen is in a power-on state;
sending, by the SF, the second information to the HWC comprises:

when the first physical screen is in the power-on state, sending, by the SF, the second information to the HWC; and
the method further comprises:
in response to the second information, controlling, by the display driver, the second screen area to display the image.

14. A foldable screen device, wherein the foldable screen device comprises one or more processors and a memory, wherein the memory is coupled to the one or more processors, the memory is configured to store computer program code, the computer program code comprises computer instructions, and the one or more processors invoke the computer instructions to enable the foldable screen device to perform the method according to any one of claims 1 to 13.
15. A chip system, wherein the chip system is applied to a foldable screen device, the chip system comprises one or more processors, and the one or more processors are configured to invoke computer instructions, to enable the foldable screen device to perform the method according to any one of claims 1 to 13.
16. A computer-readable storage medium, wherein the computer-readable storage medium comprises computer instructions, and when the computer instructions are run on a foldable screen device, the foldable screen device is enabled to perform the method according to any one of claims 1 to 13.
17. A computer program product, wherein the computer program product comprises computer program code, and when the computer program code is run on a foldable screen device, the foldable screen device is enabled to perform the method according to any one of claims 1 to 13.

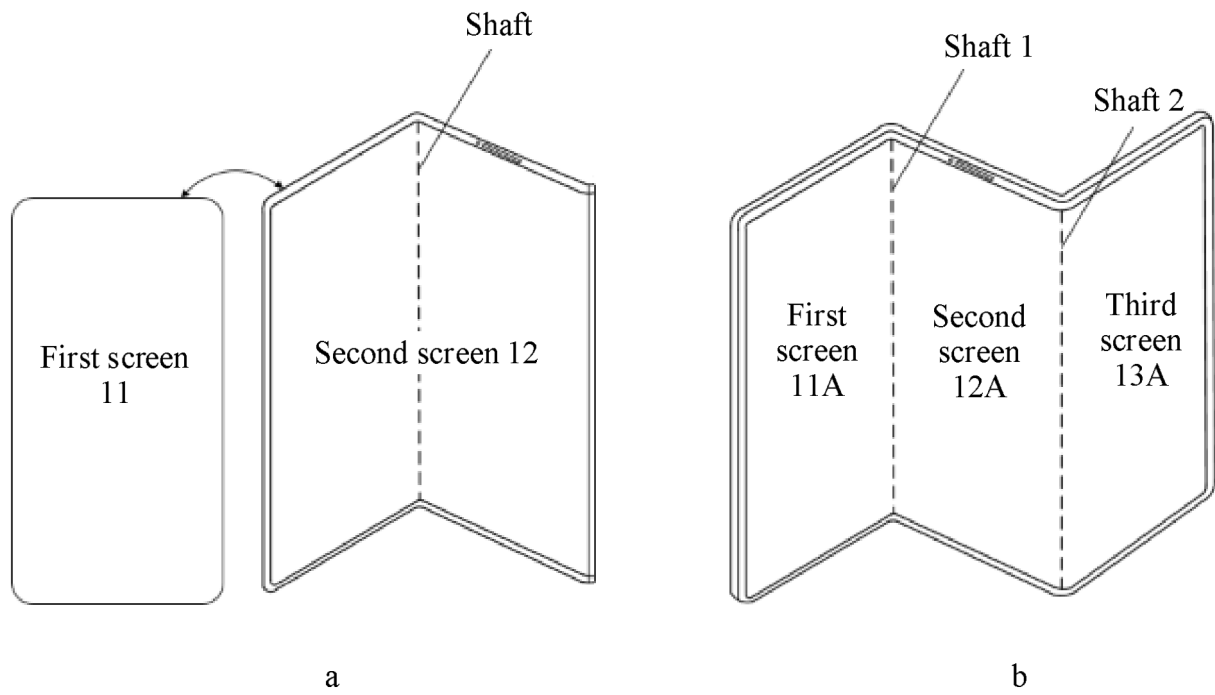


FIG. 1

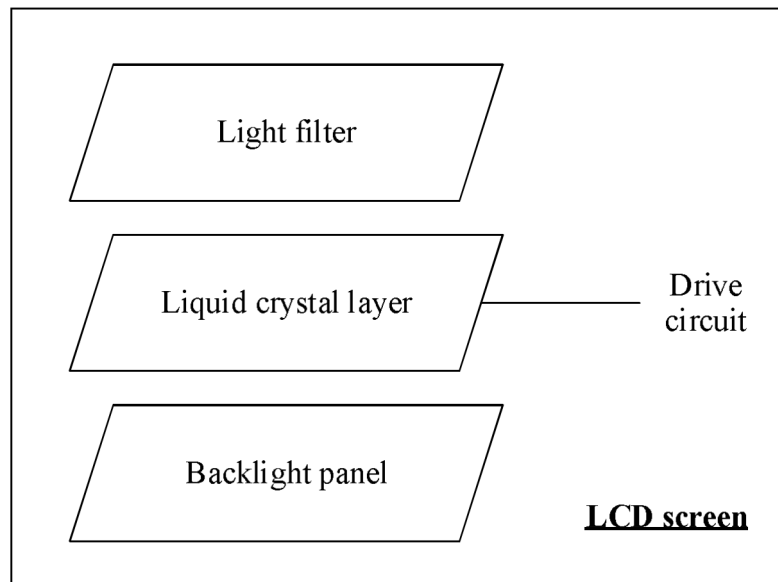


FIG. 2

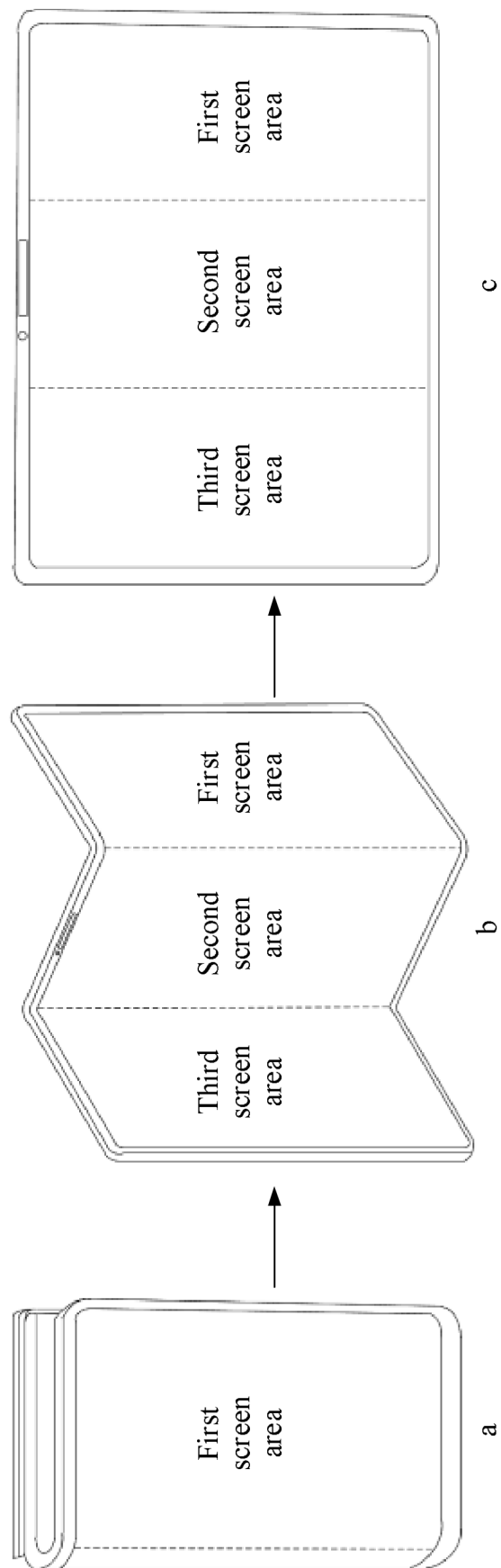


FIG. 3

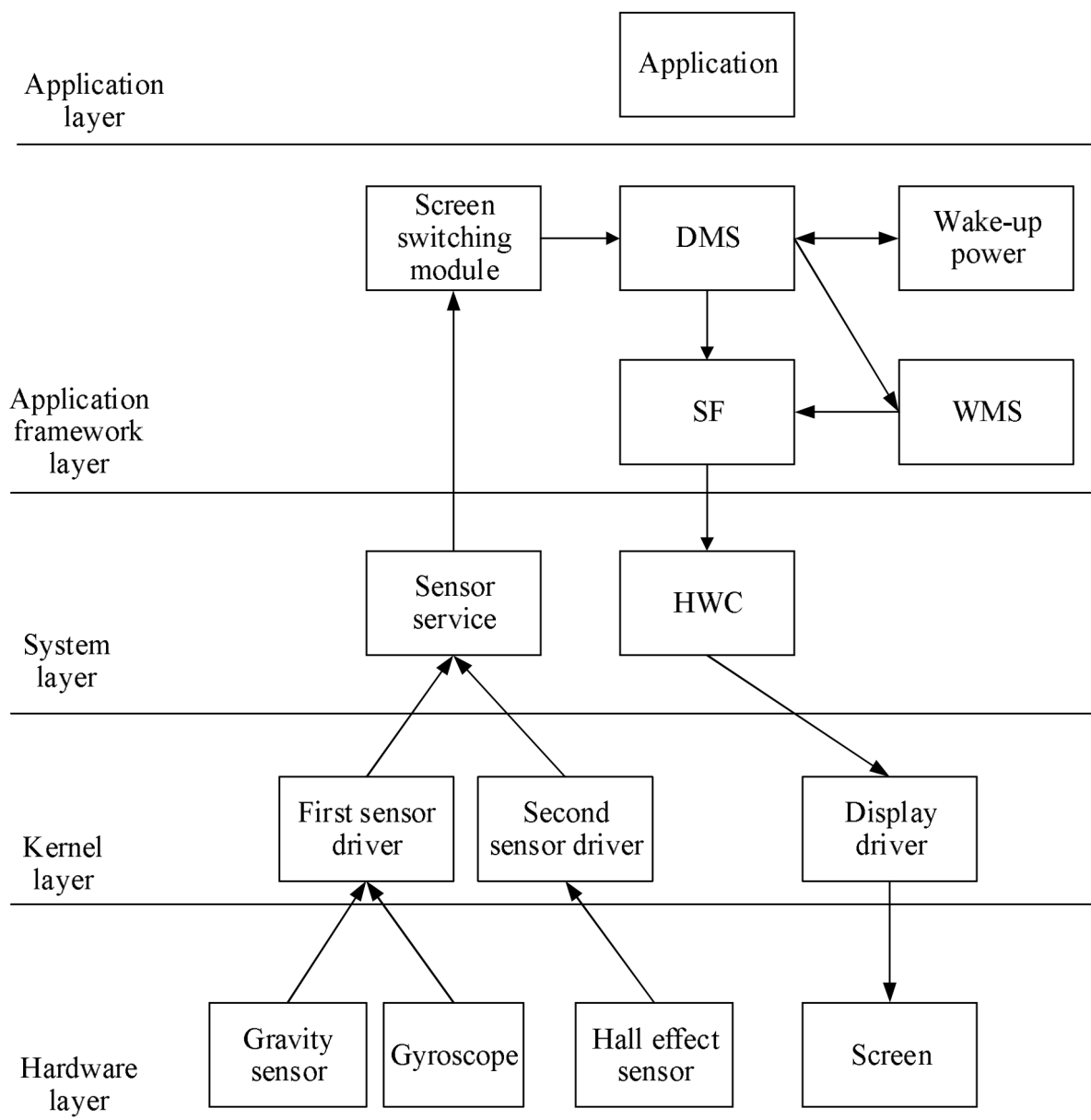


FIG. 4

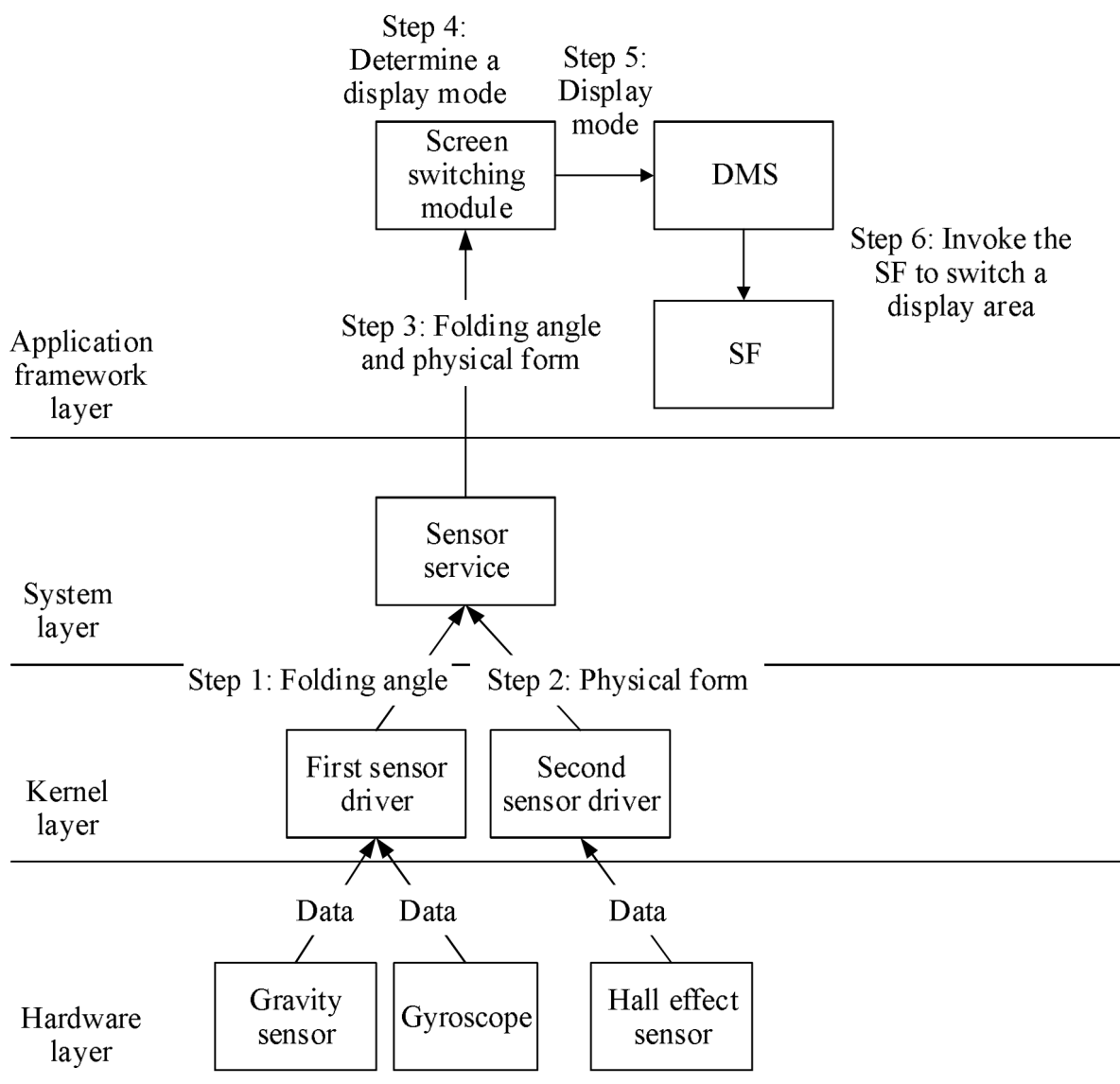


FIG. 5

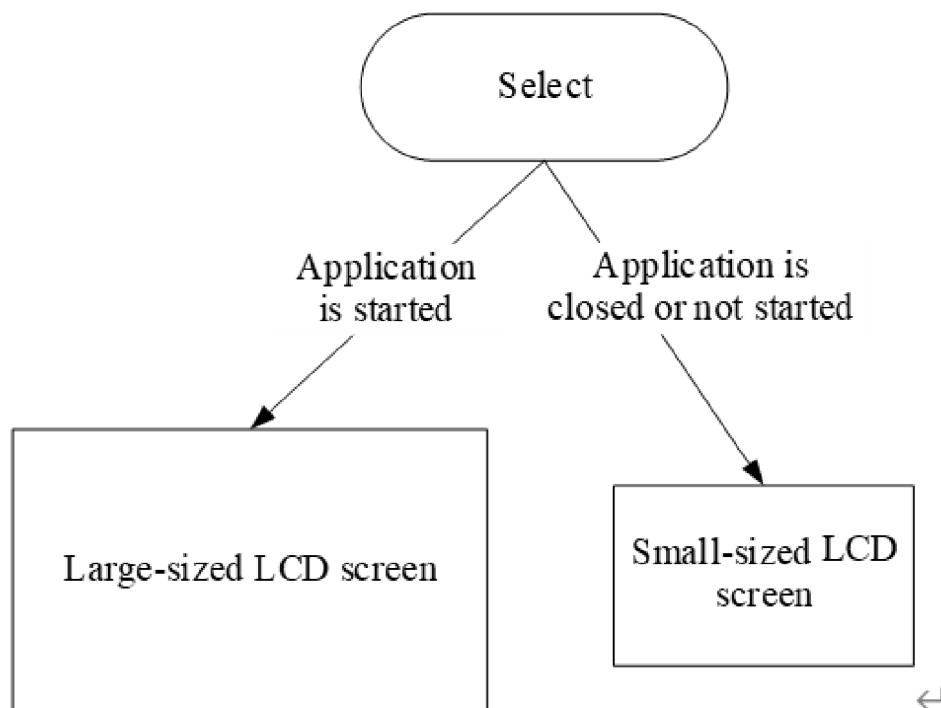


FIG. 6

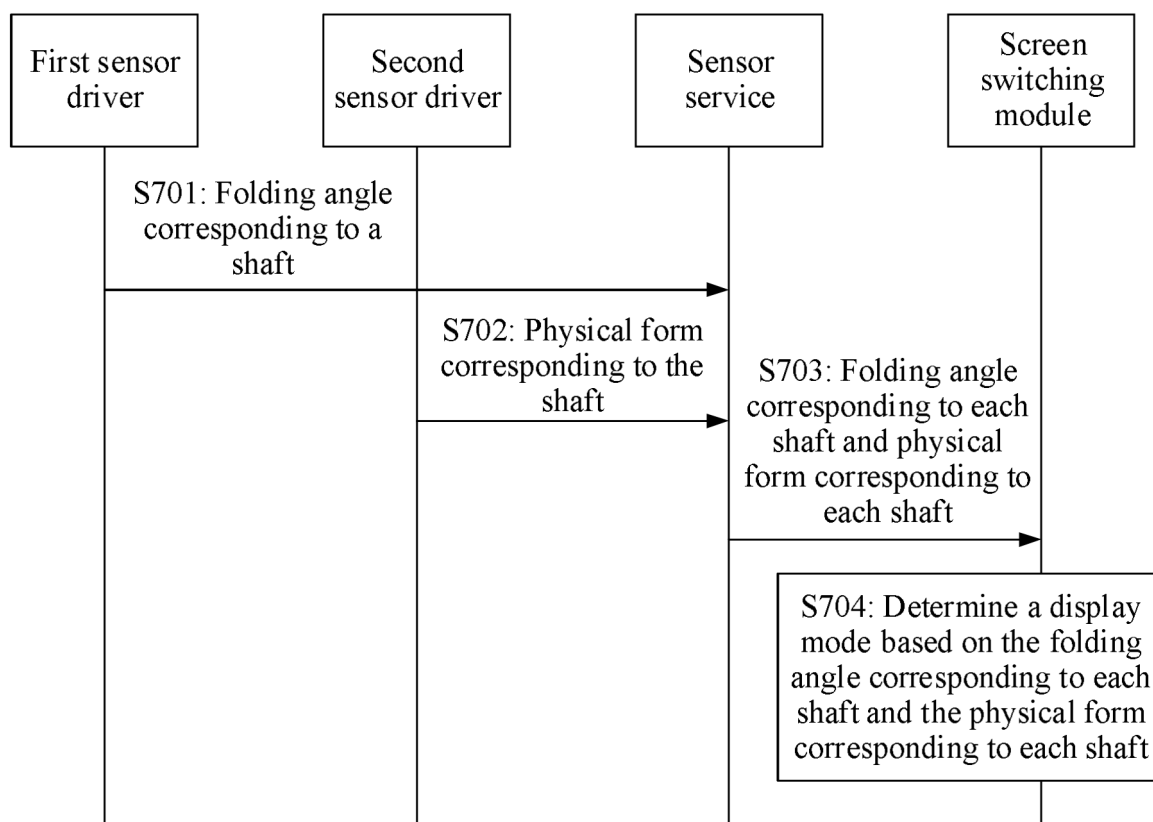


FIG. 7A

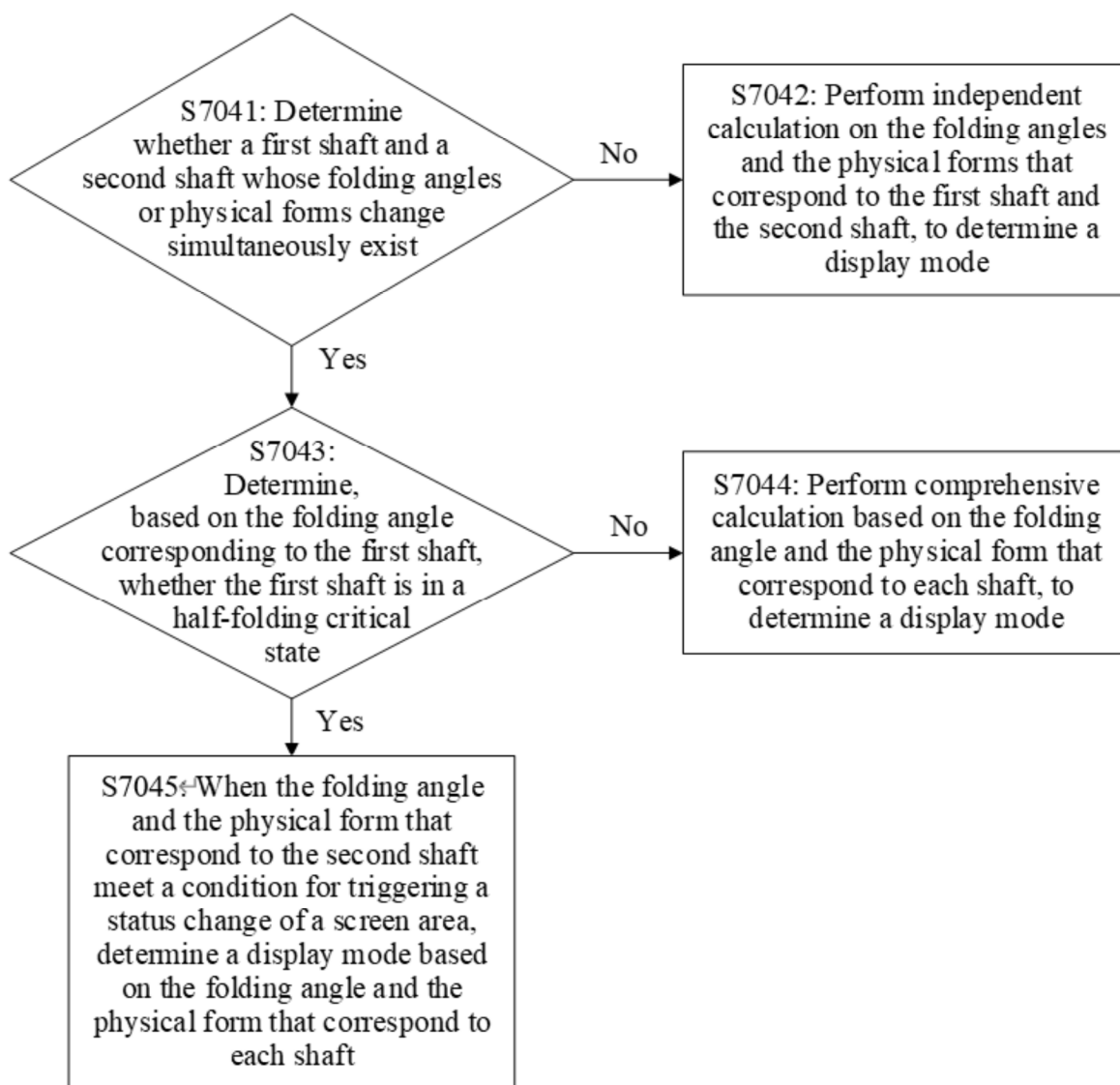


FIG. 7B

A part of screen areas on a physical screen of a foldable screen device is in a power-off state

A first screen area is switched from a screen-on state to a blank screen state, and a second screen area is switched from a blank screen state to a screen-on state

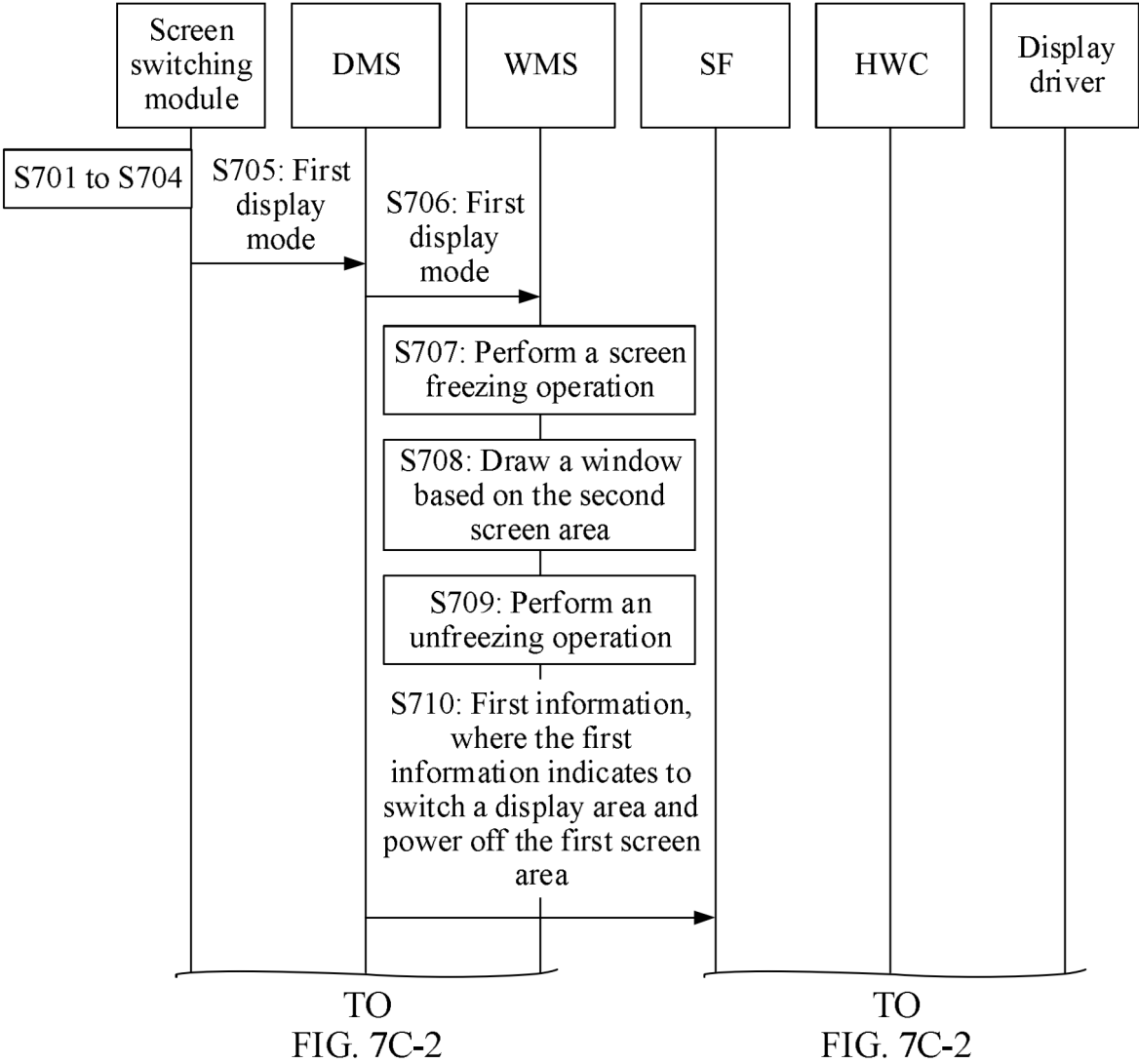


FIG. 7C-1

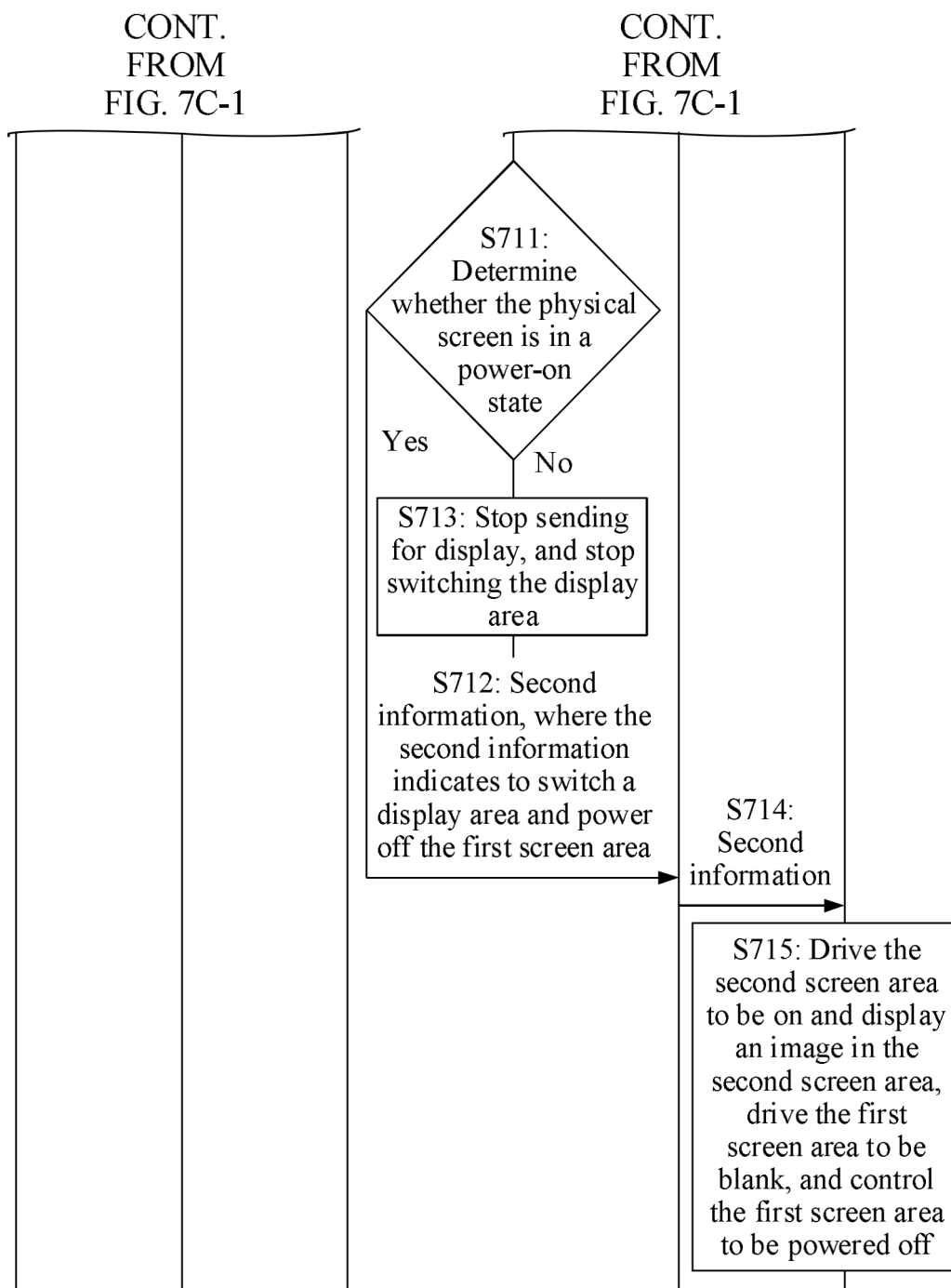


FIG. 7C-2

A physical screen of a foldable screen device is in a power-off state

A first screen area is switched from a blank screen state to a screen-on state, and a second screen area remains a blank screen state

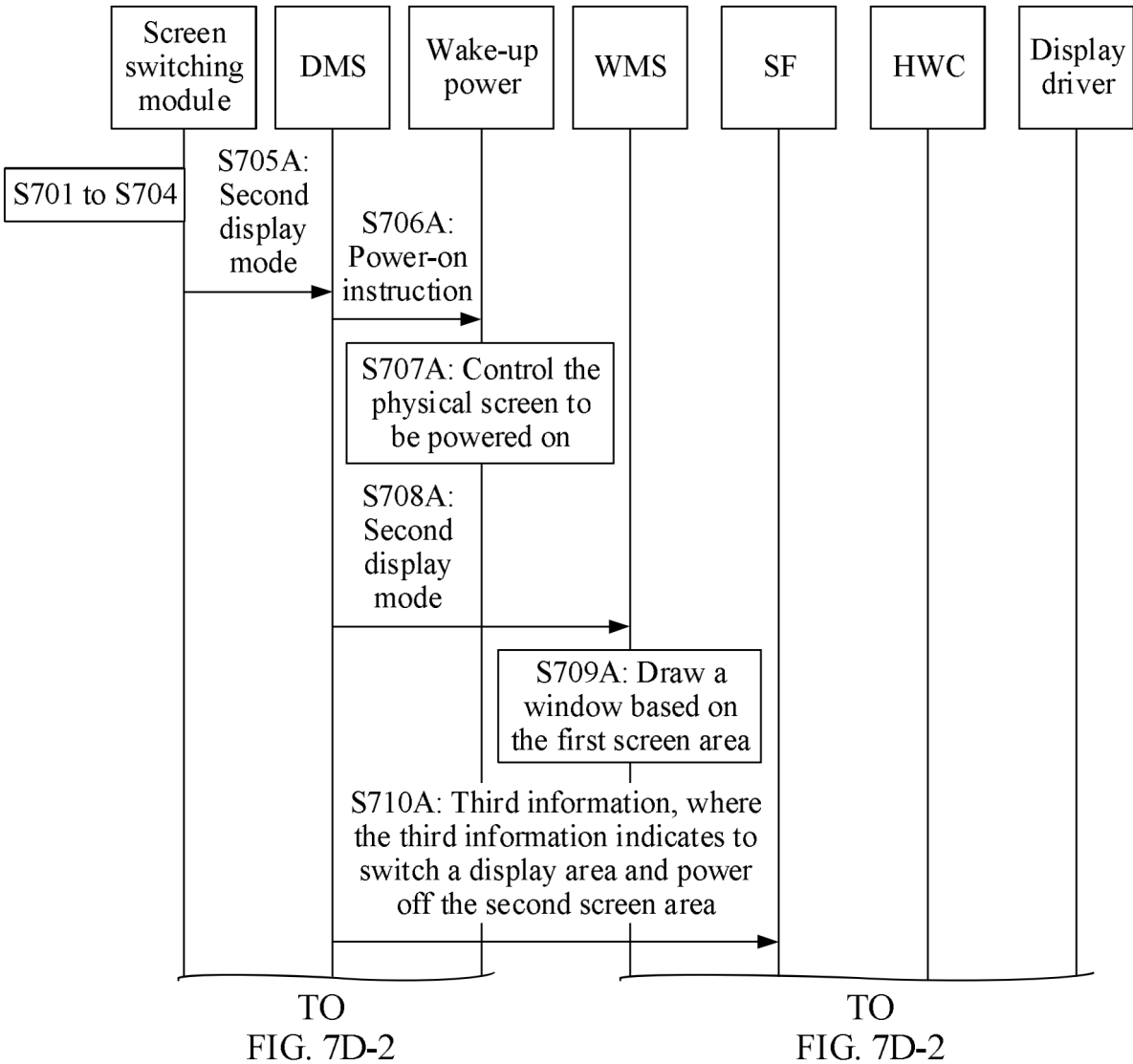


FIG. 7D-1

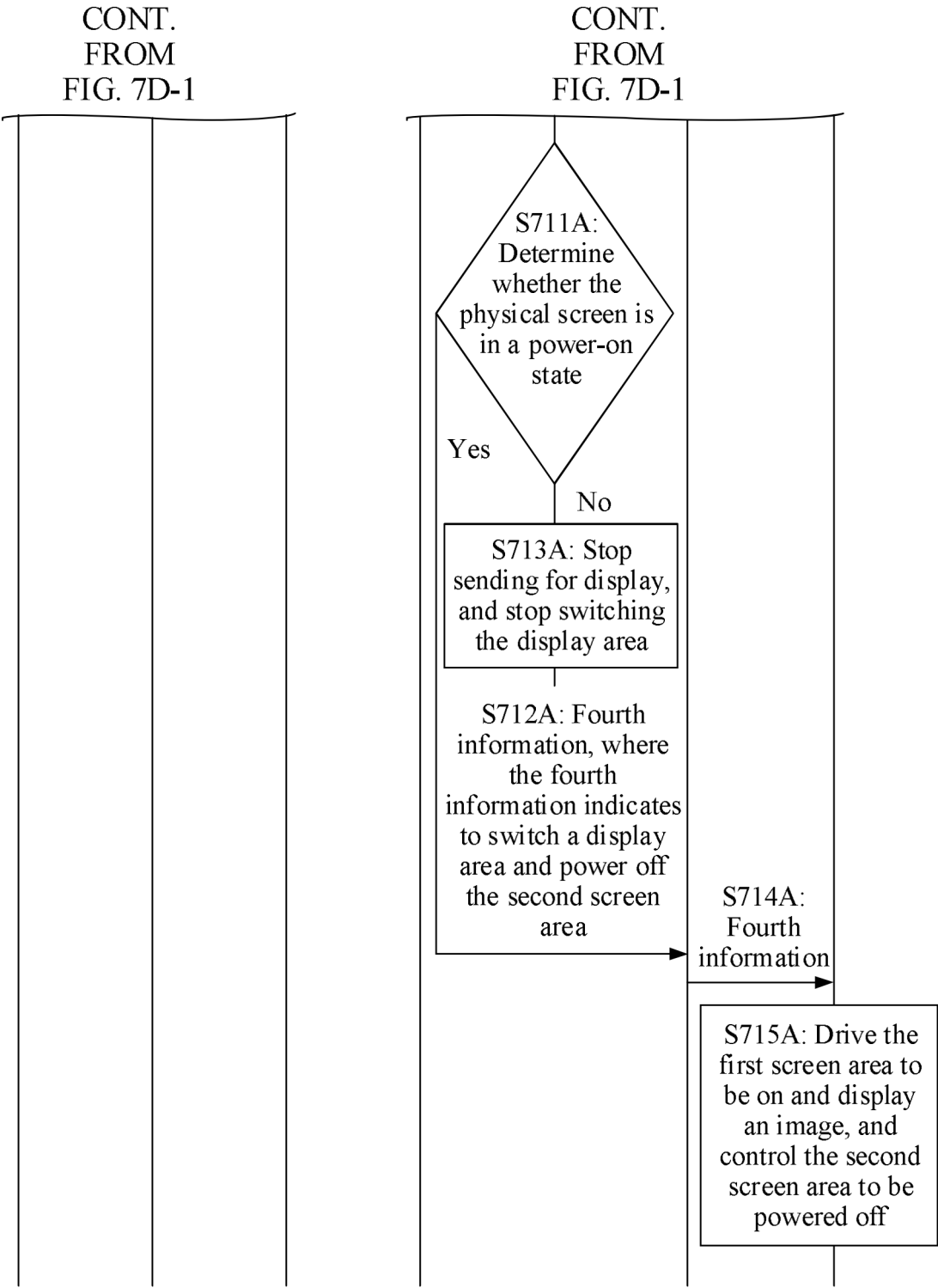


FIG. 7D-2

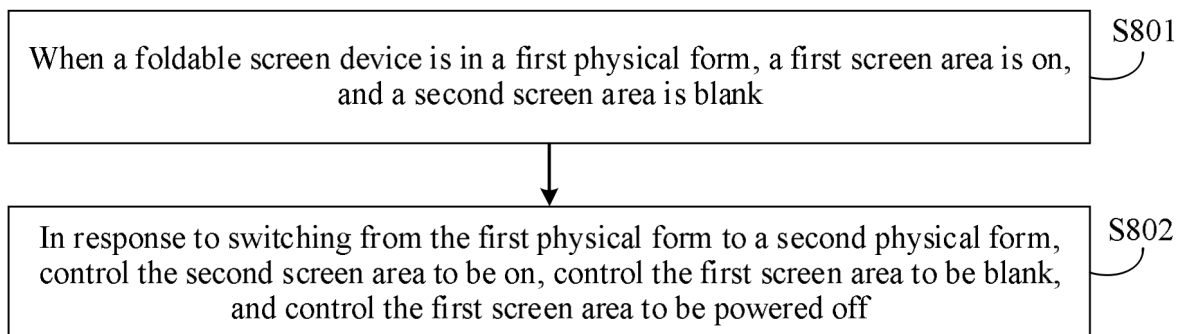


FIG. 8

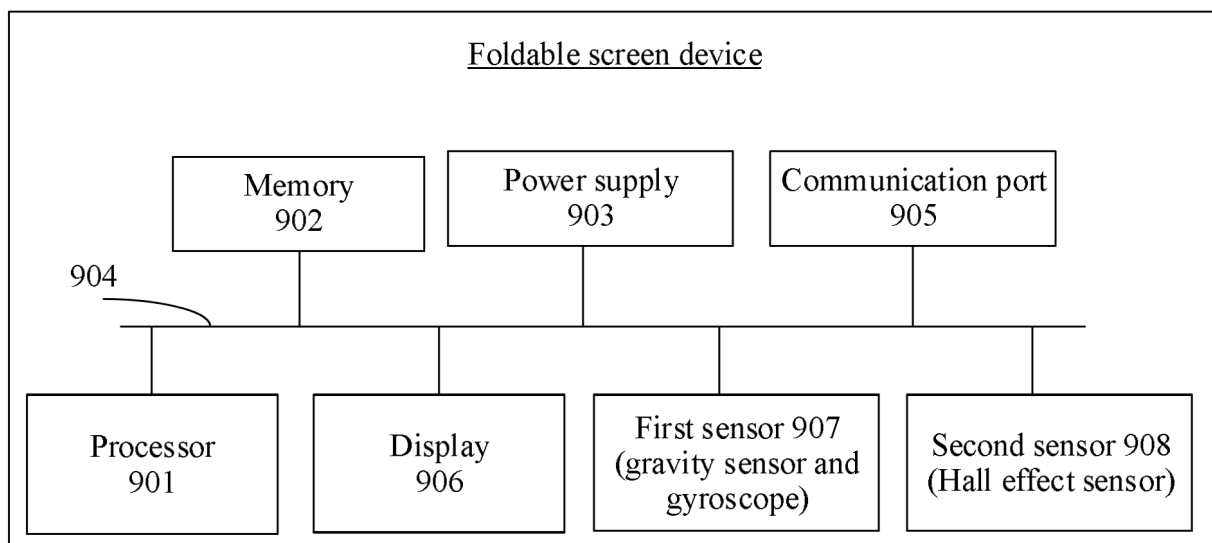


FIG. 9

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2025/095887

A. CLASSIFICATION OF SUBJECT MATTER

G09G3/00(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC:G09G.G06F.H04M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CNXTX, ENTXTX, DWPI, CNKI: 亮屏, 打开, 点亮, 显示, 黑屏, 关闭, 暗屏, 熄屏, 息屏, 熄灭, 灭屏, 暗态, 下电, 上电, 折叠, 三折, 展开, 物理形态, 物理状态, 角度, 夹角, 同时, 全部, 时间, 时刻, 半折, 悬停, 悬浮, 中间态, fold+, angle, area, half w fold+, expand+, black, clos+, screen w on

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN 117008707 A (HUAWEI TECHNOLOGIES CO., LTD.) 07 November 2023 (2023-11-07) description, paragraphs [0049]-[0398], and figures 15(a) and 15(b)	1-5, 8-17
A	CN 109979413 A (GUANGDONG OPPO MOBILE TELECOMMUNICATIONS CORP., LTD.) 05 July 2019 (2019-07-05) entire document	1-17
A	CN 116954543 A (HONOR DEVICE CO., LTD.) 27 October 2023 (2023-10-27) entire document	1-17
A	US 2018039408 A1 (SAMSUNG ELECTRONICS CO., LTD.) 08 February 2018 (2018-02-08) entire document	1-17
A	US 2021150953 A1 (SAMSUNG ELECTRONICS CO., LTD.) 20 May 2021 (2021-05-20) entire document	1-17
A	US 2023044497 A1 (HUAWEI TECHNOLOGIES CO., LTD.) 09 February 2023 (2023-02-09) entire document	1-17

☐ Further documents are listed in the continuation of Box C.
 ☒ See patent family annex.

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"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 16 June 2025	Date of mailing of the international search report 23 June 2025
Name and mailing address of the ISA/CN China National Intellectual Property Administration (ISA/CN) China No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088	Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2025/095887

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Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)			Publication date (day/month/year)
CN	117008707	A	07 November 2023	WO	2023207828	A1	02 November 2023
				EP	4488797	A1	08 January 2025
				US	2025044856	A1	06 February 2025
CN	109979413	A	05 July 2019	CN	109979413	B	02 February 2021
CN	116954543	A	27 October 2023	None			
US	2018039408	A1	08 February 2018	KR	20180015533	A	13 February 2018
				KR	102571369	B1	29 August 2023
				US	10534534	B2	14 January 2020
US	2021150953	A1	20 May 2021	WO	2021101189	A1	27 May 2021
				KR	20210060874	A	27 May 2021
US	2023044497	A1	09 February 2023	JP	2023514962	A	12 April 2023
				EP	4084450	A1	02 November 2022
				EP	4084450	B1	20 March 2024
				US	12210376	B2	28 January 2025
				WO	2021147712	A1	29 July 2021

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- CN 202410789488 [0001]