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(54) **METHOD FOR DRIVING DISPLAY PANEL AND DISPLAY APPARATUS**

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G06F 3/0354	(2006.01)

(52) **U.S. Cl.**

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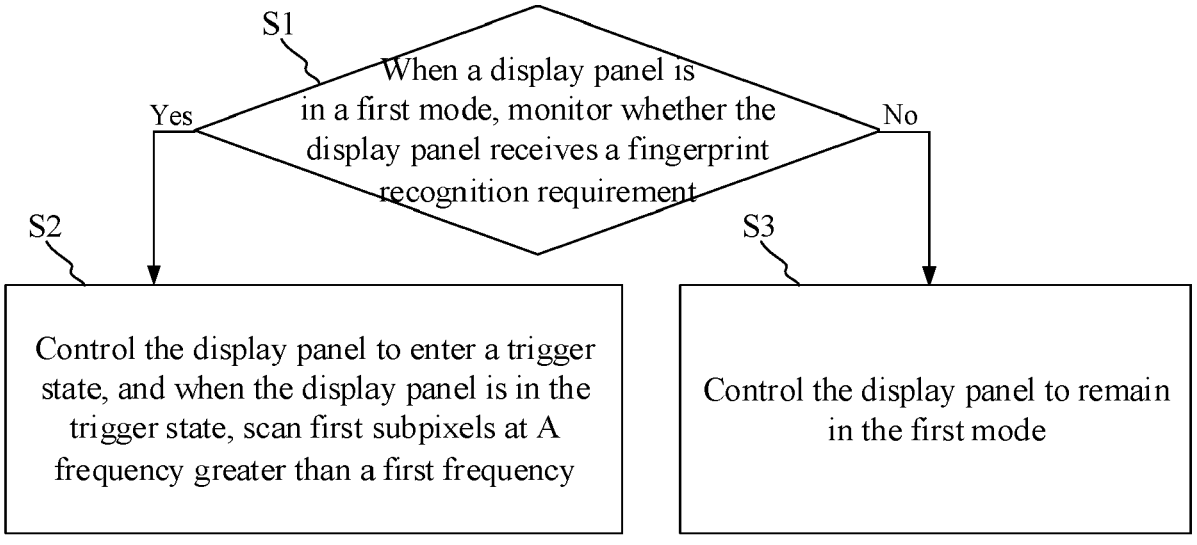
(57) **ABSTRACT**

A method for driving a display panel and a display apparatus are provided. The display panel includes a display region including a fingerprint recognition region and includes subpixels located in the display region, and the subpixels include first subpixels located in the fingerprint recognition region and used as a light source for fingerprint recognition. In a first mode, the subpixels are scanned at a first frequency, and in the second mode, the subpixels are scanned at a second frequency. The second frequency is greater than the first frequency. The method includes: when the display panel is in the first mode, monitoring whether the display panel receives a fingerprint recognition requirement, and if yes, controlling the display panel to enter a trigger state; and when the display panel is in the trigger state, scanning the first subpixels at a frequency greater than the first frequency.



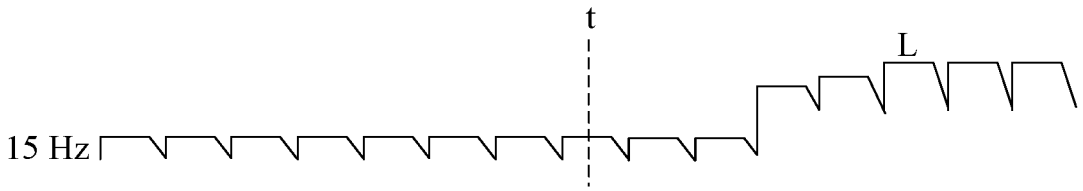


FIG. 1

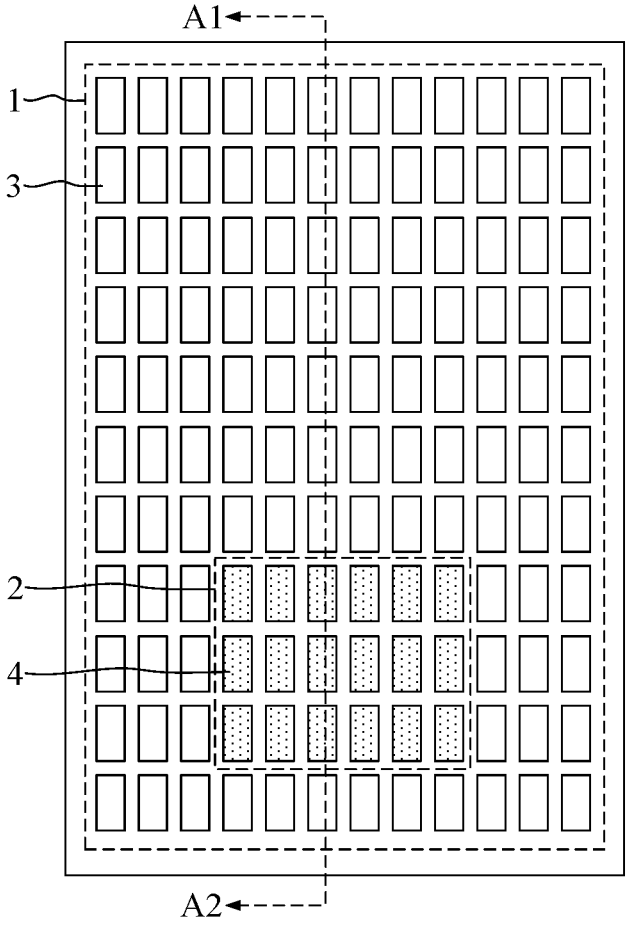


FIG. 2

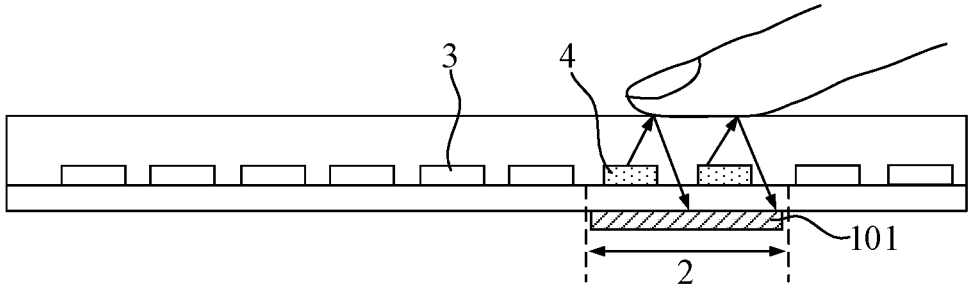


FIG. 3

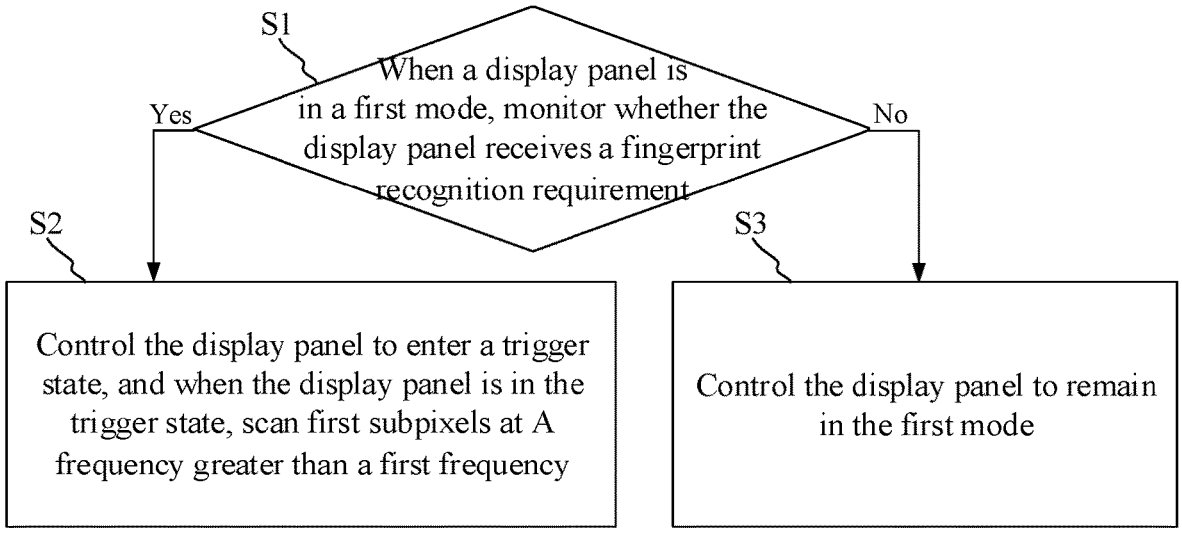

S1
When a display panel is in a first mode, monitor whether the display panel receives a fingerprint recognition requirement
Yes
No
S2
S3
Control the display panel to enter a trigger state, and when the display panel is in the trigger state, scan first subpixels at A frequency greater than a first frequency
Control the display panel to remain in the first mode

FIG. 4

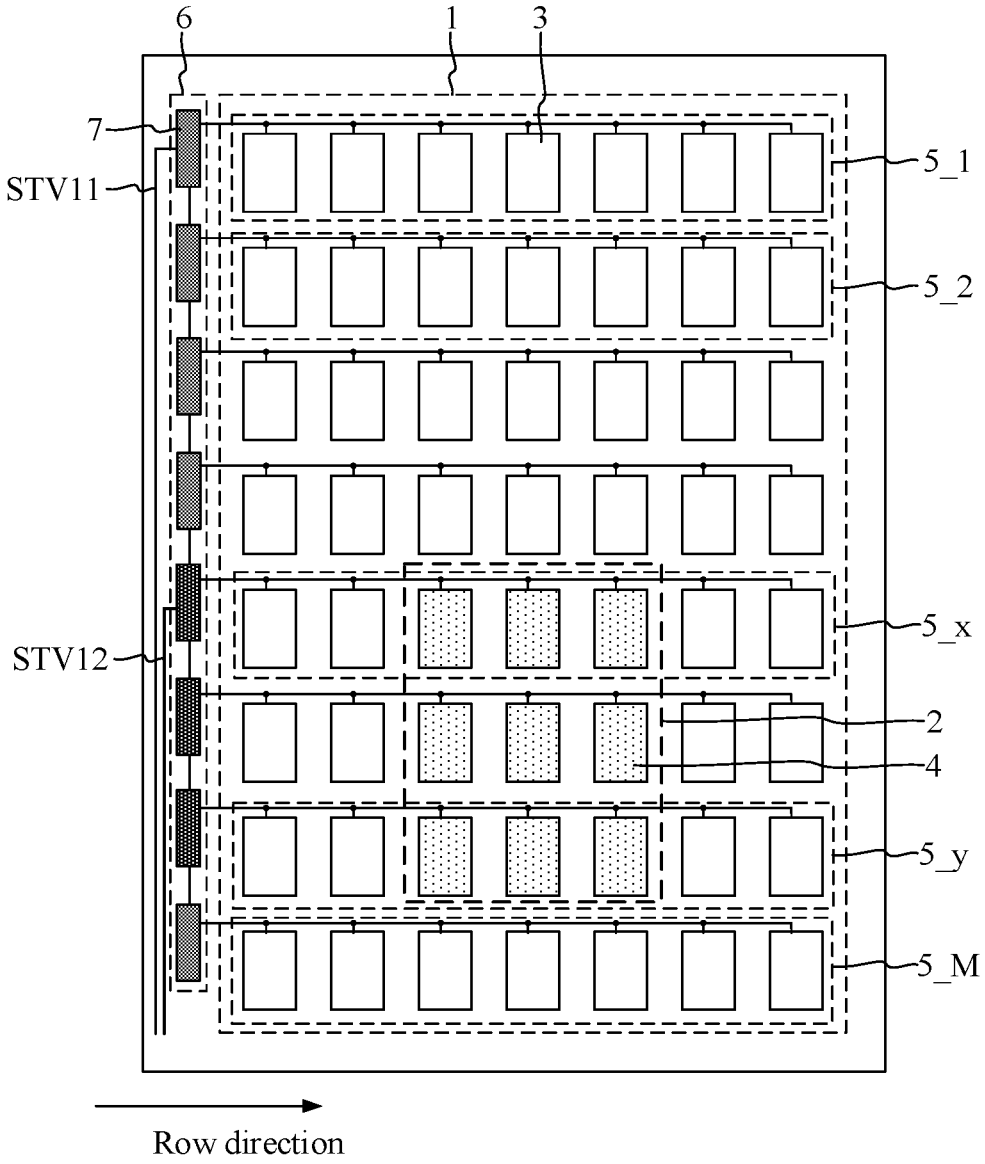


FIG. 5

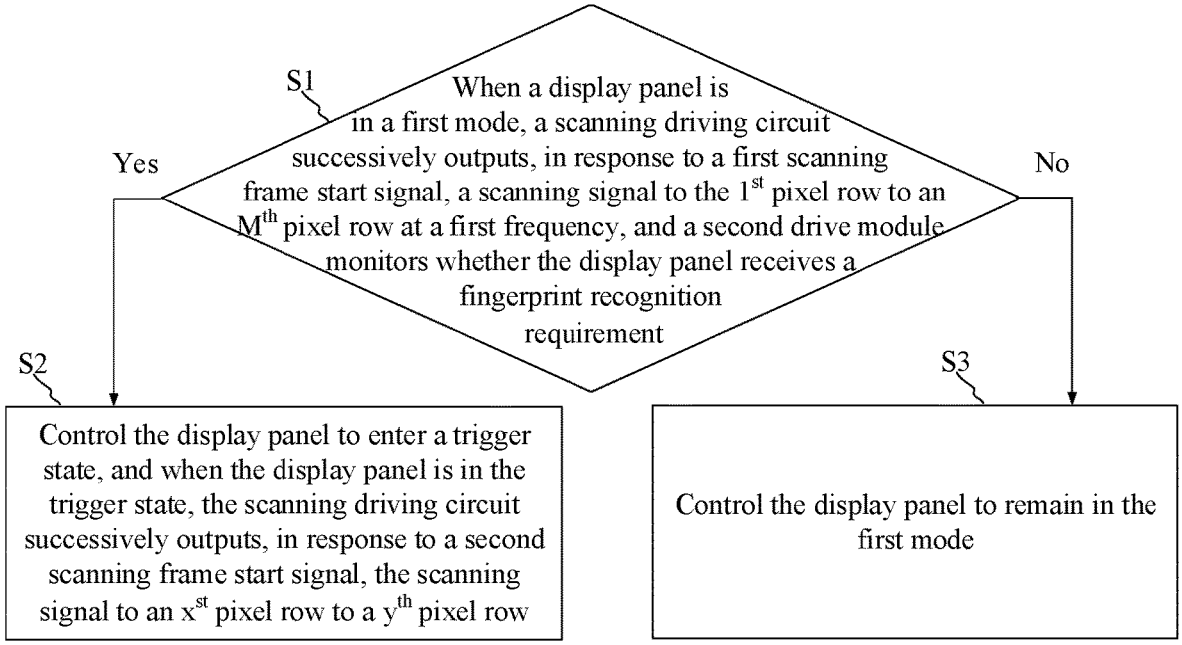

S1
When a display panel is in a first mode, a scanning driving circuit successively outputs, in response to a first scanning frame start signal, a scanning signal to the 1st pixel row to an Mth pixel row at a first frequency, and a second drive module monitors whether the display panel receives a fingerprint recognition requirement
Yes
No
S2
Control the display panel to enter a trigger state, and when the display panel is in the trigger state, the scanning driving circuit successively outputs, in response to a second scanning frame start signal, the scanning signal to an xst pixel row to a yth pixel row
S3
Control the display panel to remain in the first mode

FIG. 6

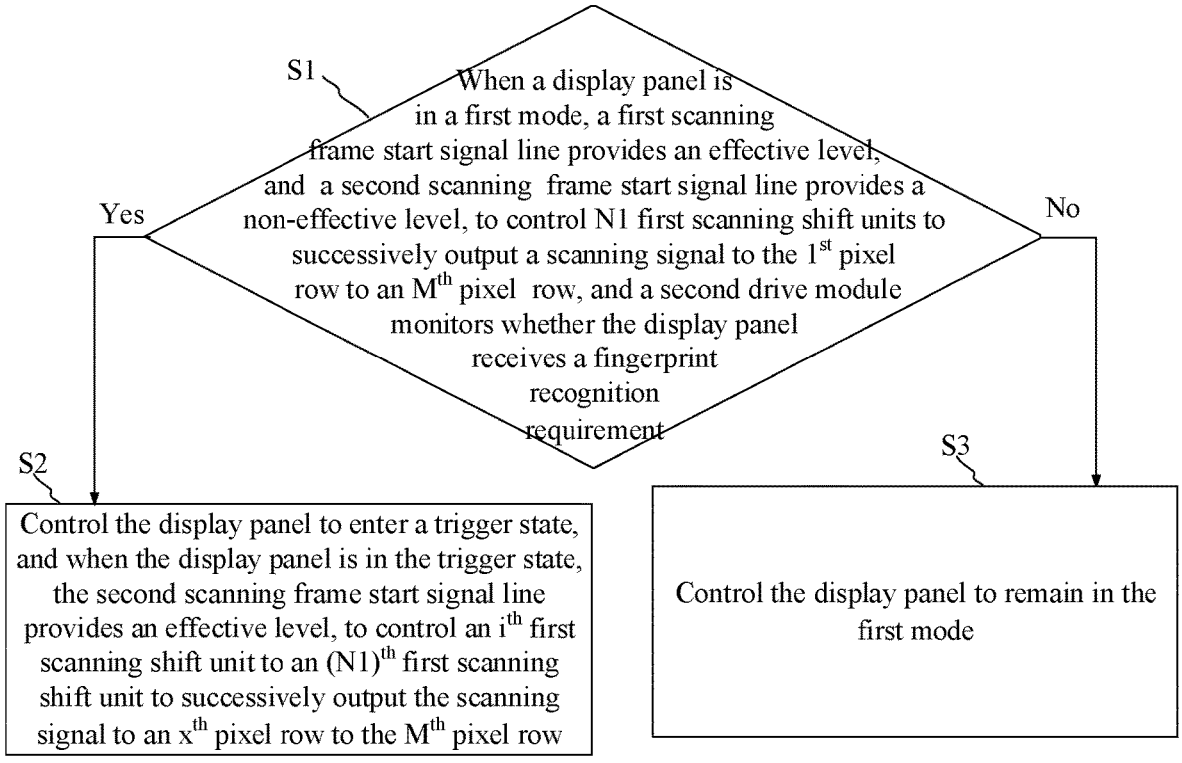

S1
When a display panel is in a first mode, a first scanning frame start signal line provides an effective level, and a second scanning frame start signal line provides a non-effective level, to control N1 first scanning shift units to successively output a scanning signal to the 1st pixel row to an Mth pixel row, and a second drive module monitors whether the display panel receives a fingerprint recognition requirement
Yes
No
S2
Control the display panel to enter a trigger state, and when the display panel is in the trigger state, the second scanning frame start signal line provides an effective level, to control an ith first scanning shift unit to an (N1)th first scanning shift unit to successively output the scanning signal to an xth pixel row to the Mth pixel row
S3
Control the display panel to remain in the first mode

FIG. 7

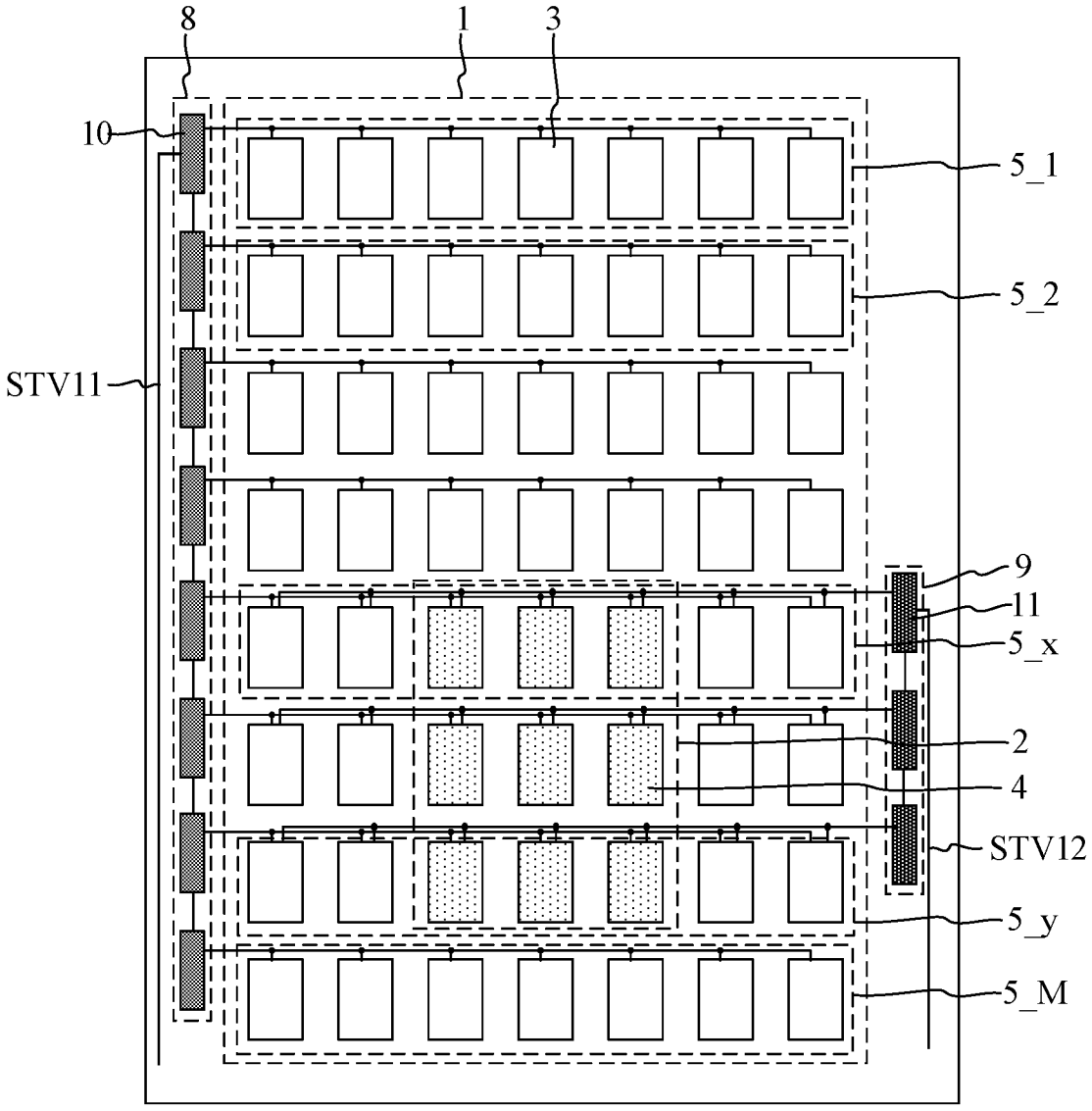


FIG. 8

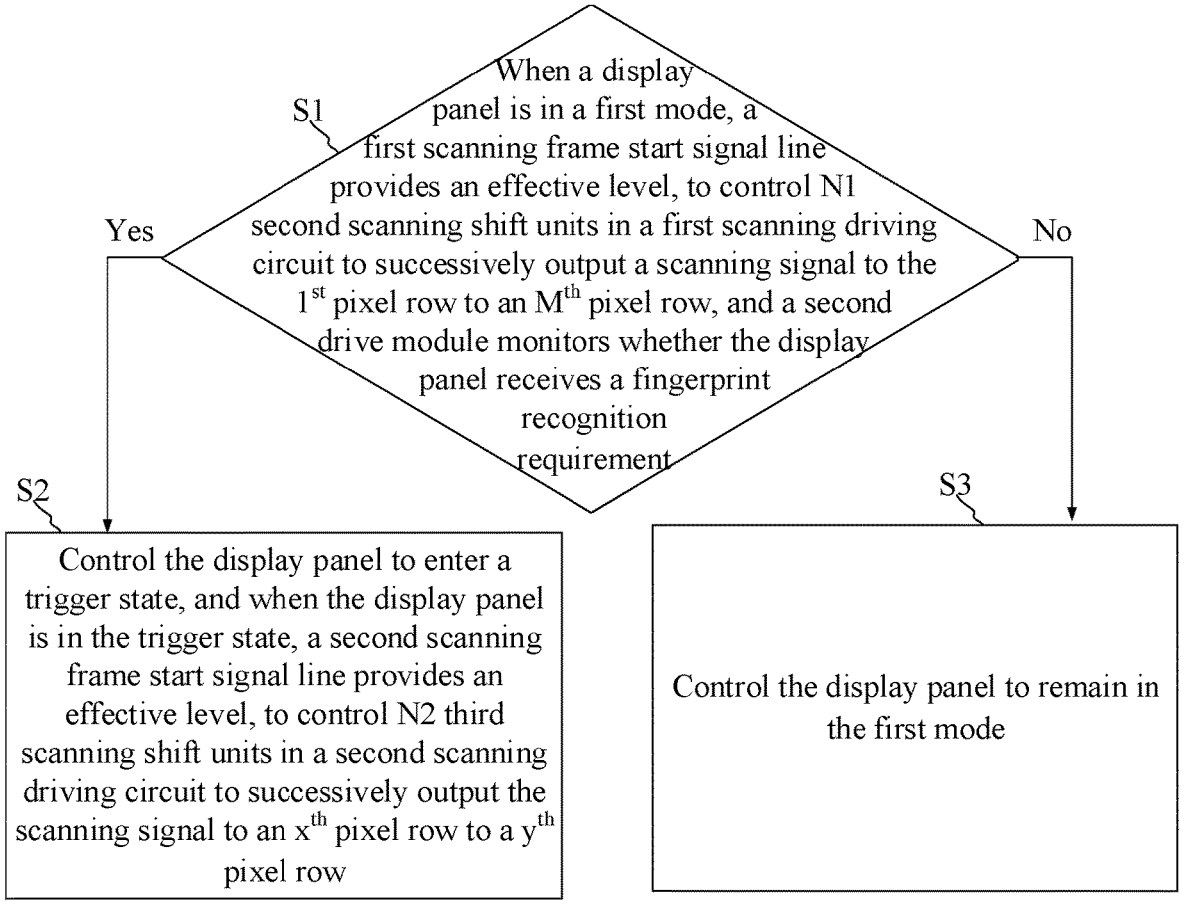

S1
When a display panel is in a first mode, a first scanning frame start signal line provides an effective level, to control N1 second scanning shift units in a first scanning driving circuit to successively output a scanning signal to the 1st pixel row to an Mth pixel row, and a second drive module monitors whether the display panel receives a fingerprint recognition requirement
Yes
No
S2
Control the display panel to enter a trigger state, and when the display panel is in the trigger state, a second scanning frame start signal line provides an effective level, to control N2 third scanning shift units in a second scanning driving circuit to successively output the scanning signal to an xth pixel row to a yth pixel row
S3
Control the display panel to remain in the first mode

FIG. 9

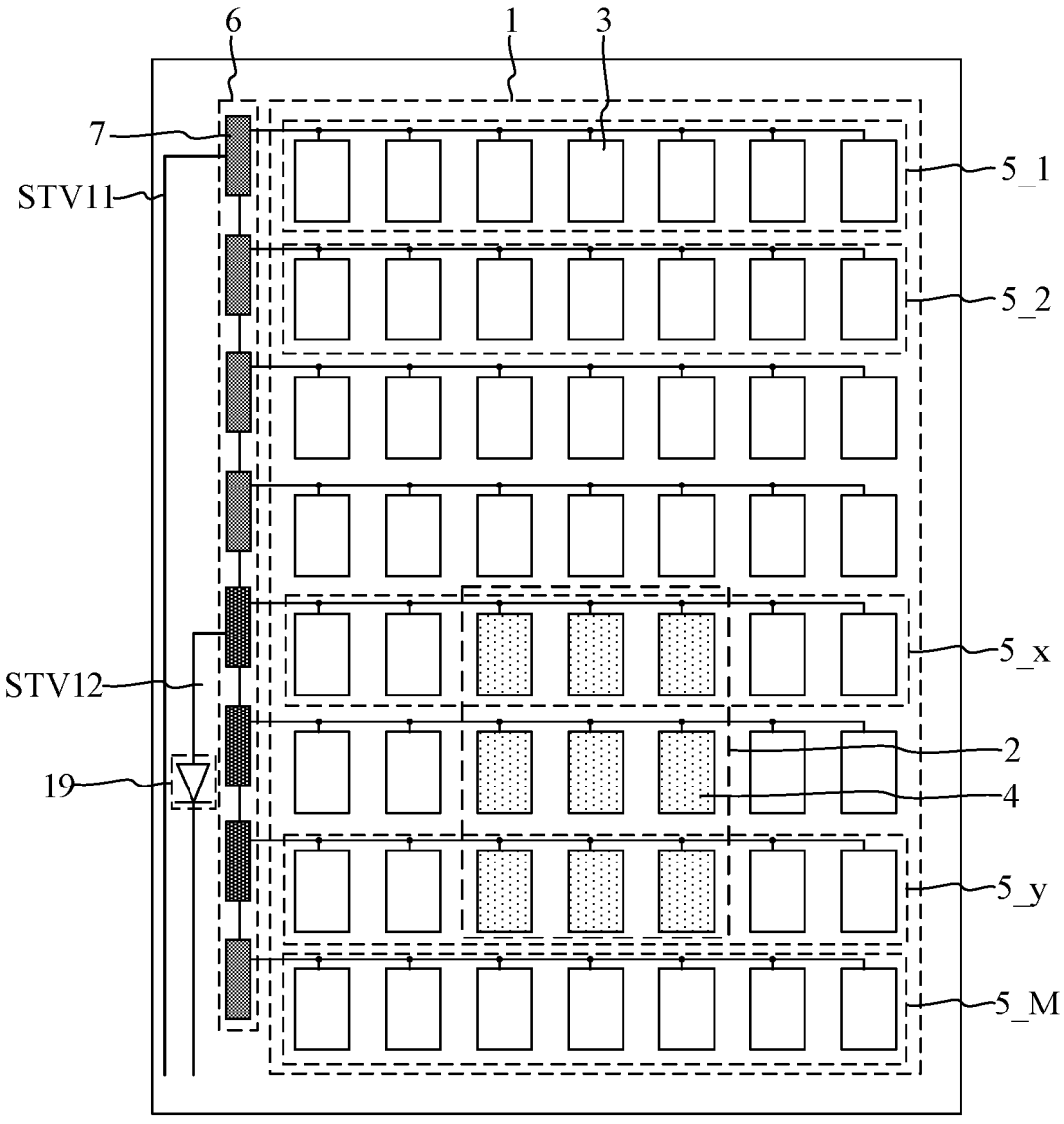


FIG. 10

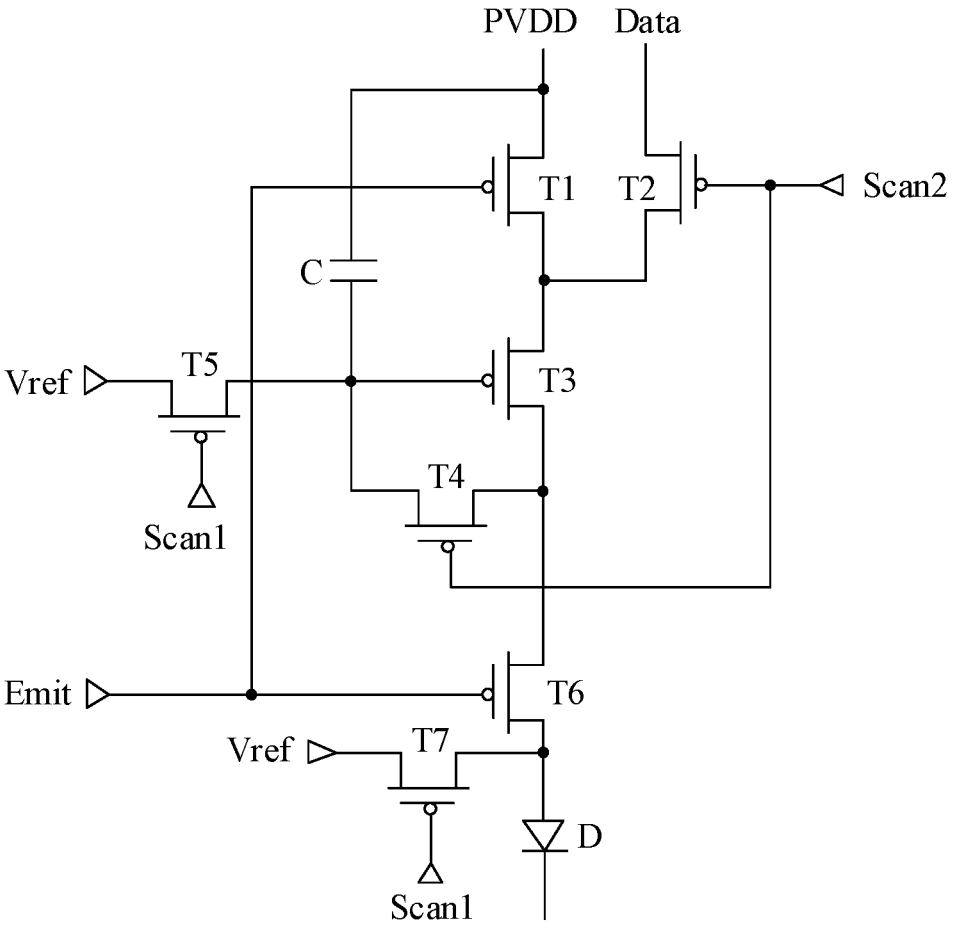

PVDD
Data
T1
T2
Scan2
C
Vref
T5
T3
T4
Scan1
Emit
T6
Vref
T7
D
Scan1

FIG. 11

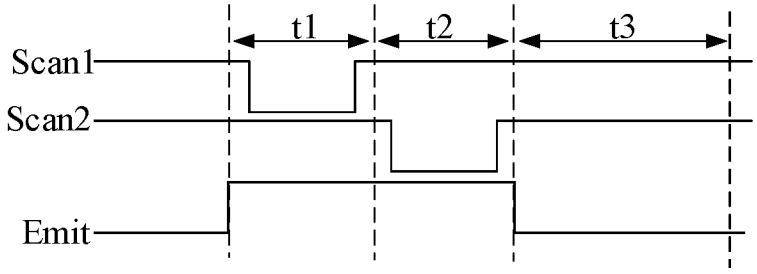

t1
t2
t3
Scan1
Scan2
Emit

FIG. 12

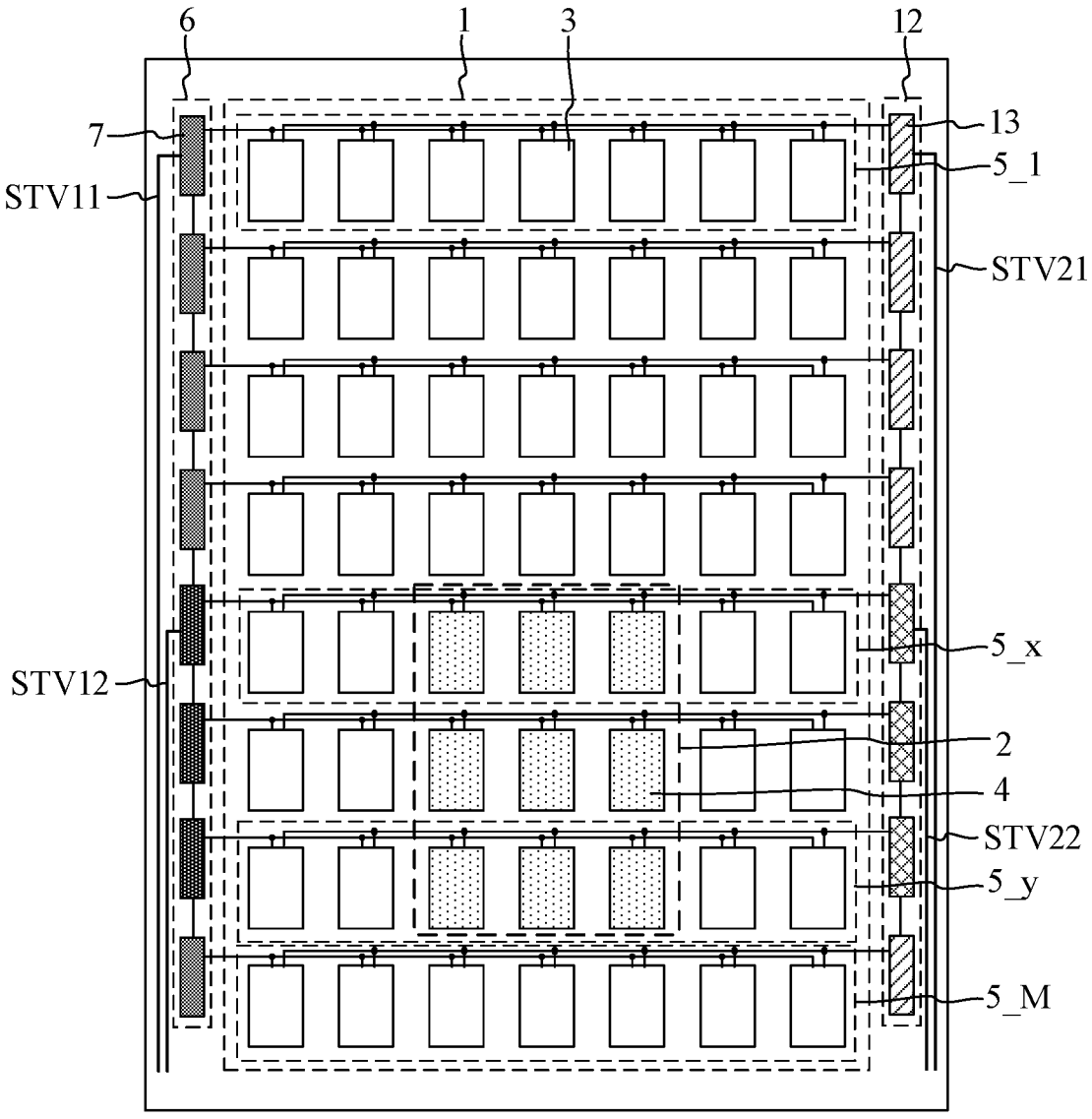


FIG. 13

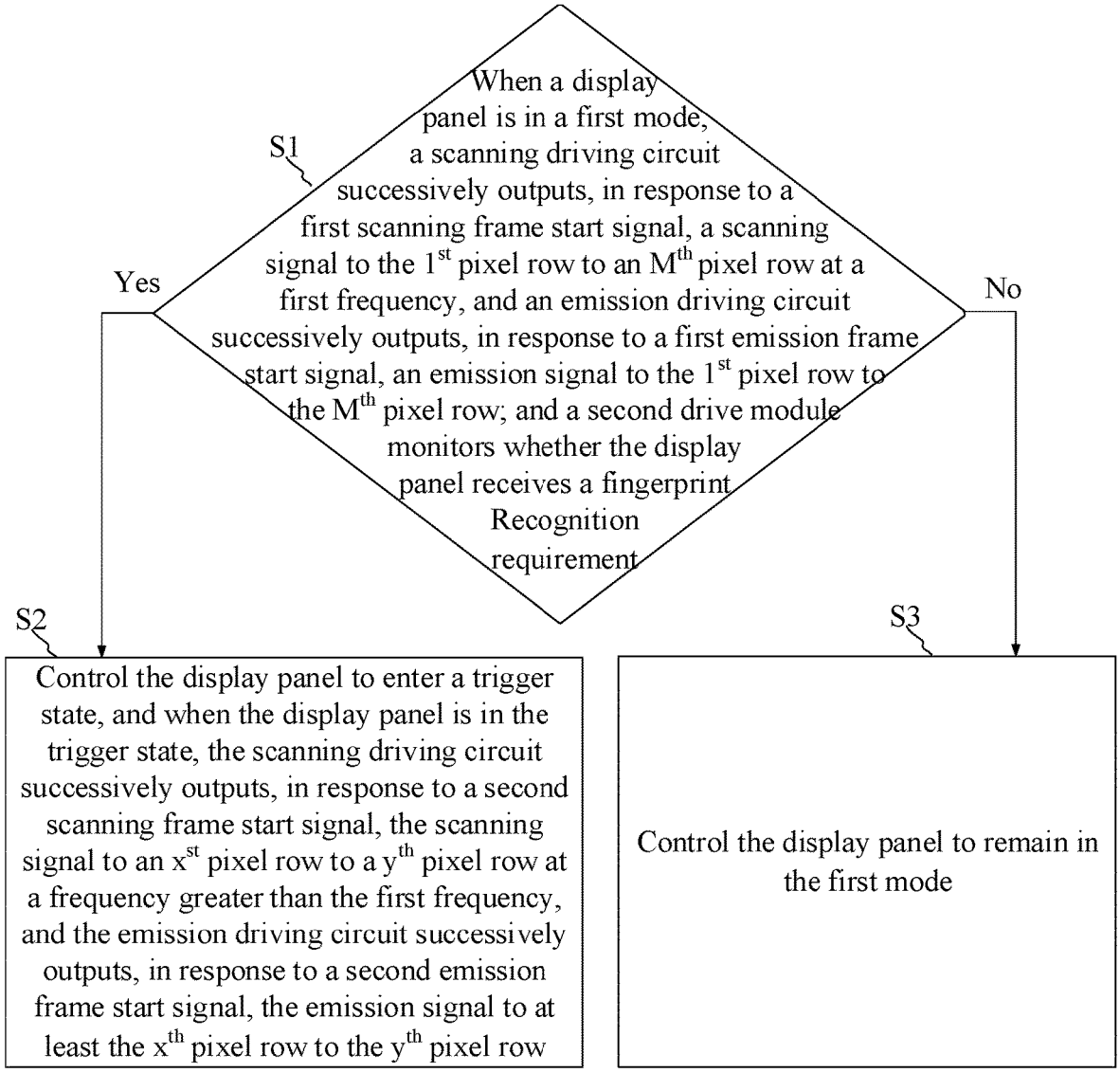

When a display panel is in a first mode, a scanning driving circuit successively outputs, in response to a first scanning frame start signal, a scanning signal to the 1st pixel row to an Mth pixel row at a first frequency, and an emission driving circuit successively outputs, in response to a first emission frame start signal, an emission signal to the 1st pixel row to the Mth pixel row; and a second drive module monitors whether the display panel receives a fingerprint Recognition requirement
S1
Yes
No
S2
S3
Control the display panel to enter a trigger state, and when the display panel is in the trigger state, the scanning driving circuit successively outputs, in response to a second scanning frame start signal, the scanning signal to an xst pixel row to a yth pixel row at a frequency greater than the first frequency, and the emission driving circuit successively outputs, in response to a second emission frame start signal, the emission signal to at least the xth pixel row to the yth pixel row
Control the display panel to remain in the first mode

FIG. 14

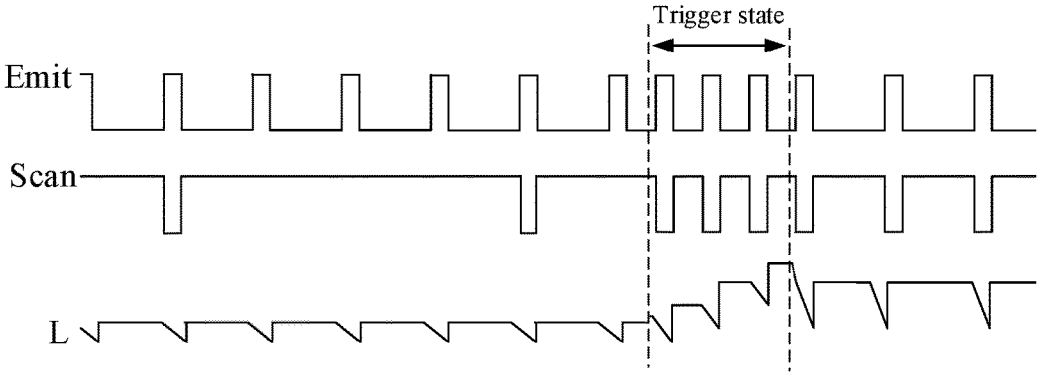

Trigger state
Emit
Scan
L

FIG. 15

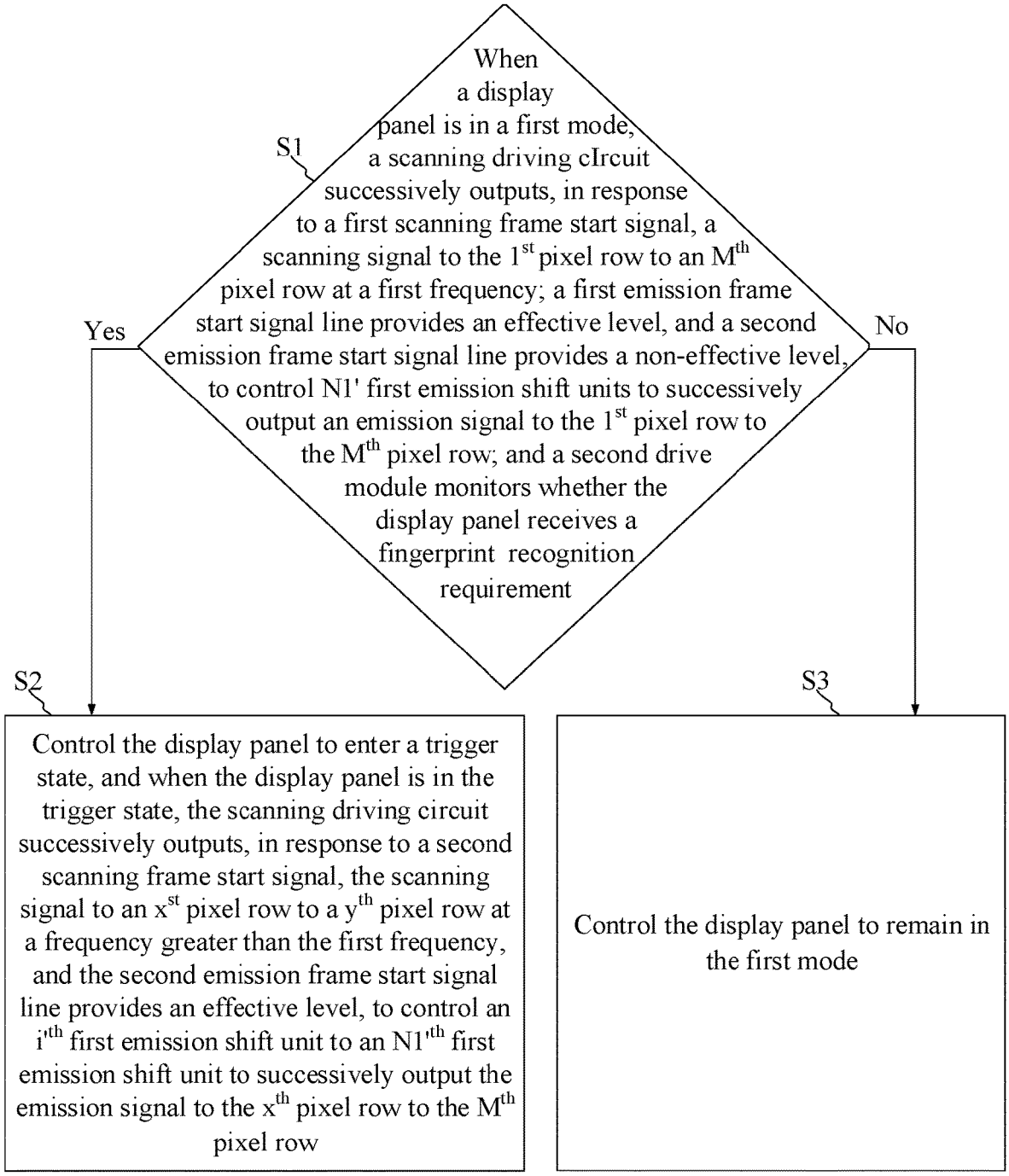

When a display panel is in a first mode, a scanning driving cIrcuit successively outputs, in response to a first scanning frame start signal, a scanning signal to the 1st pixel row to an Mth pixel row at a first frequency; a first emission frame start signal line provides an effective level, and a second emission frame start signal line provides a non-effective level, to control N1' first emission shift units to successively output an emission signal to the 1st pixel row to the Mth pixel row; and a second drive module monitors whether the display panel receives a fingerprint recognition requirement
S1
Yes
No
S2
S3
Control the display panel to enter a trigger state, and when the display panel is in the trigger state, the scanning driving circuit successively outputs, in response to a second scanning frame start signal, the scanning signal to an xst pixel row to a yth pixel row at a frequency greater than the first frequency, and the second emission frame start signal line provides an effective level, to control an ith first emission shift unit to an N1'th first emission shift unit to successively output the emission signal to the xth pixel row to the Mth pixel row
Control the display panel to remain in the first mode

FIG. 16

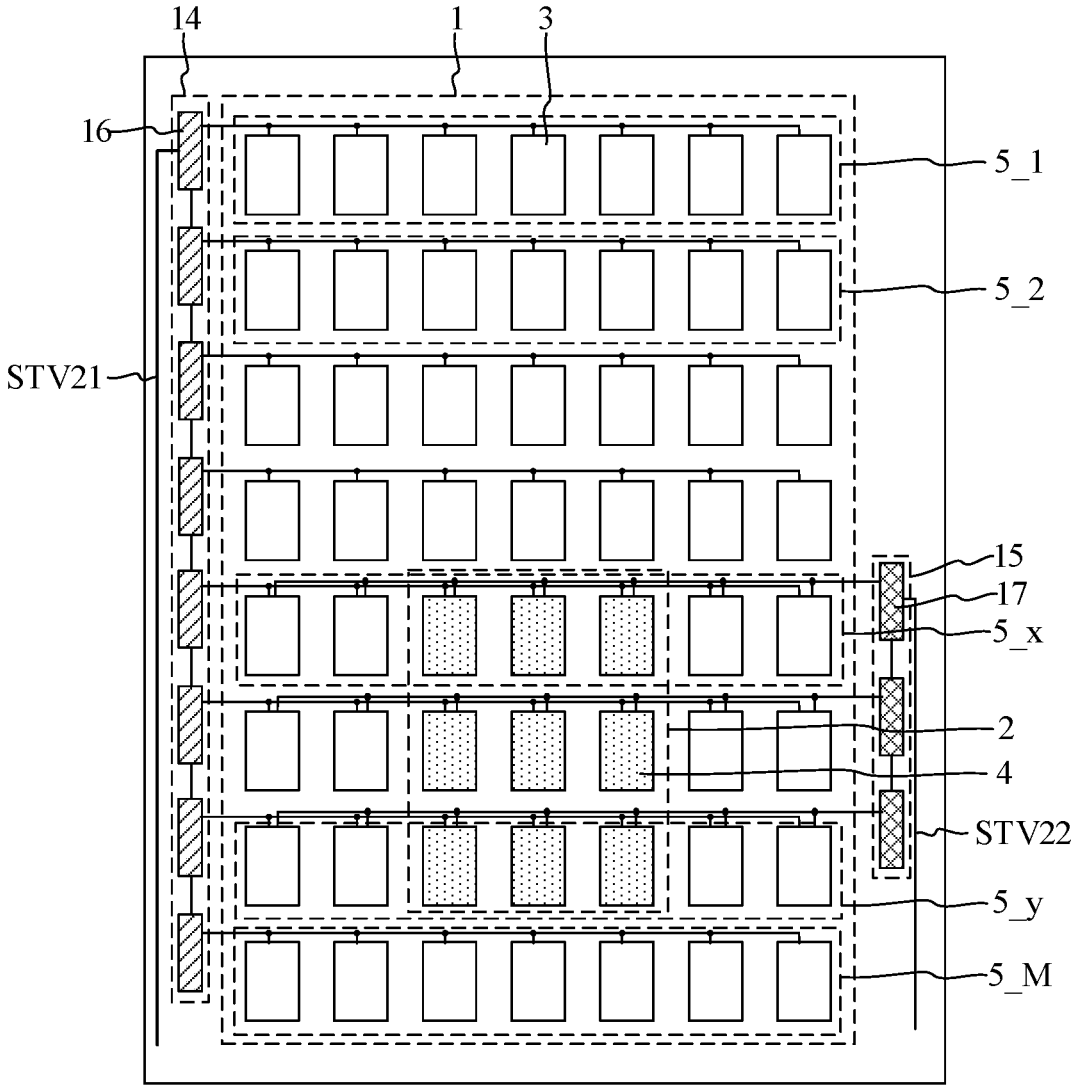


FIG. 17

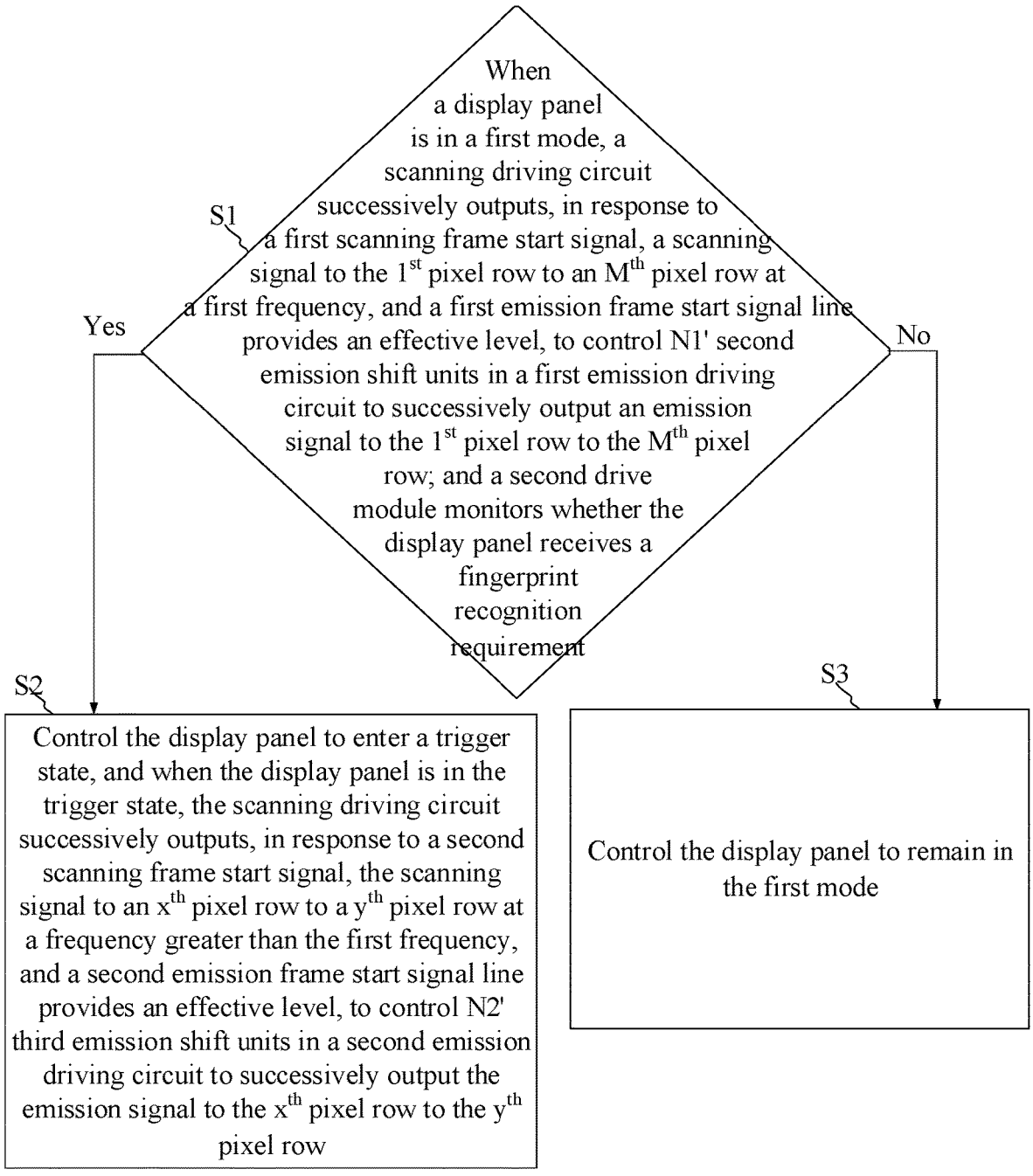

When a display panel is in a first mode, a scanning driving circuit successively outputs, in response to a first scanning frame start signal, a scanning signal to the 1st pixel row to an Mth pixel row at a first frequency, and a first emission frame start signal line provides an effective level, to control N1' second emission shift units in a first emission driving circuit to successively output an emission signal to the 1st pixel row to the Mth pixel row; and a second drive module monitors whether the display panel receives a fingerprint recognition requirement
S1
Yes
No
S2
Control the display panel to enter a trigger state, and when the display panel is in the trigger state, the scanning driving circuit successively outputs, in response to a second scanning frame start signal, the scanning signal to an xth pixel row to a yth pixel row at a frequency greater than the first frequency, and a second emission frame start signal line provides an effective level, to control N2' third emission shift units in a second emission driving circuit to successively output the emission signal to the xth pixel row to the yth pixel row
S3
Control the display panel to remain in the first mode

FIG. 18

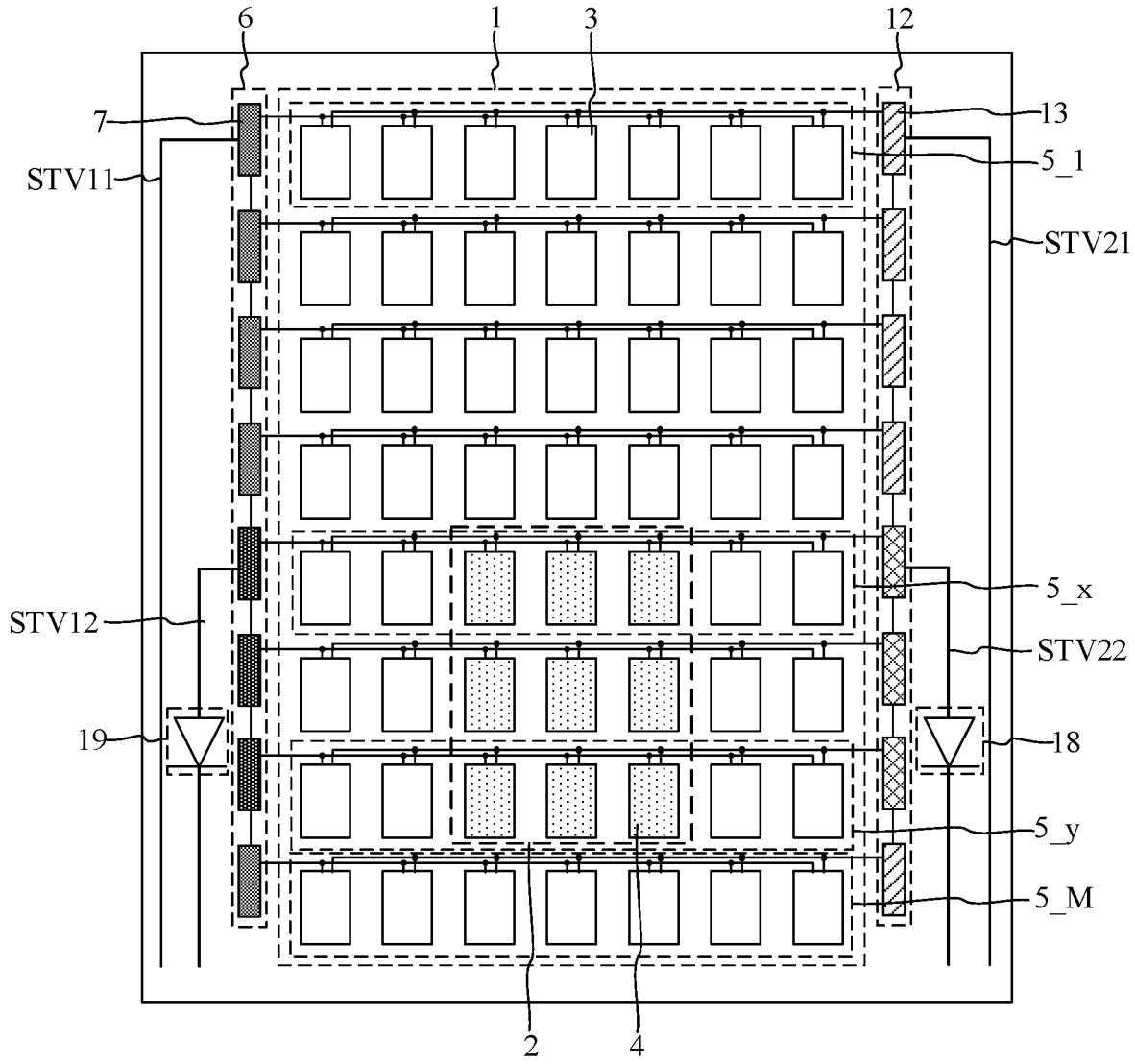


FIG. 19

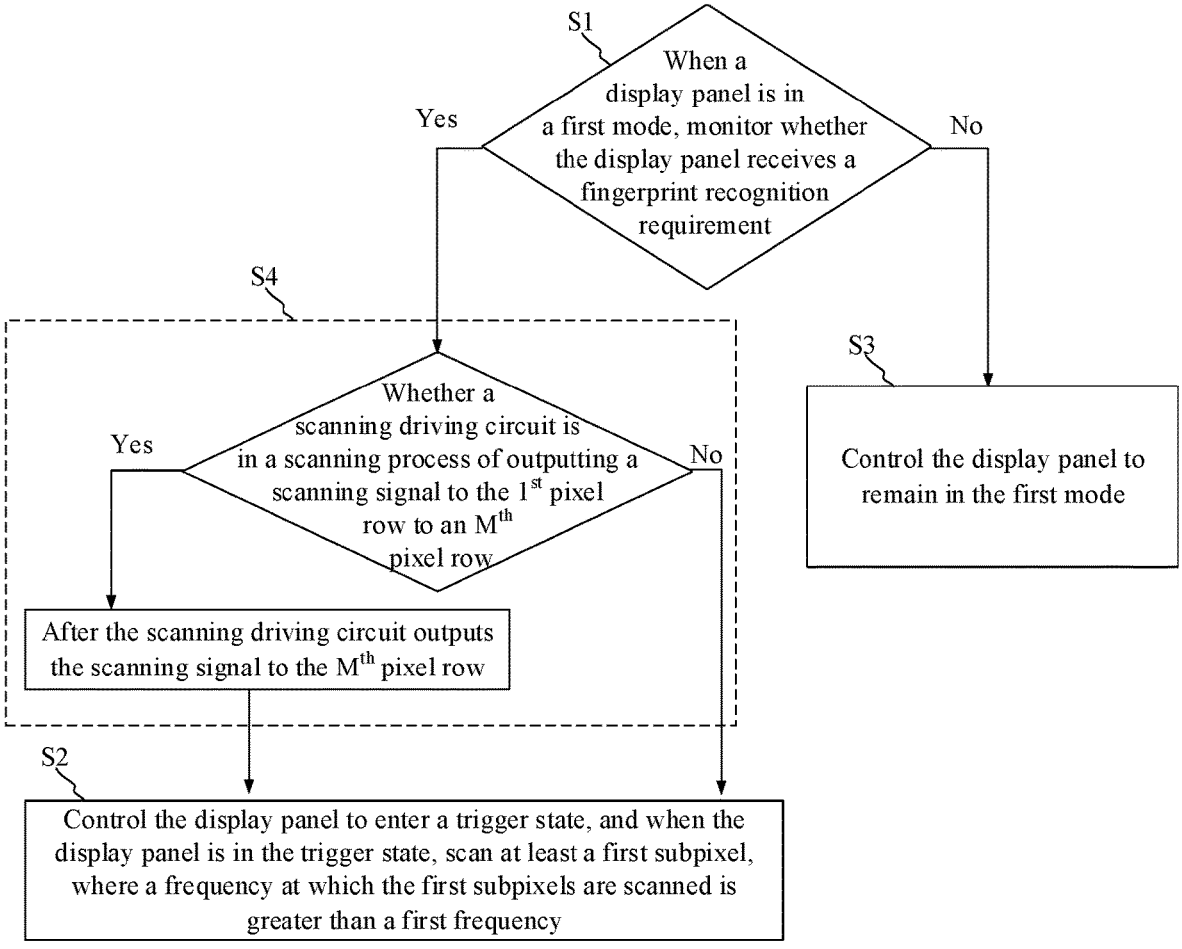

S1
When a display panel is in a first mode, monitor whether the display panel receives a fingerprint recognition requirement
Yes
No
S4
Whether a scanning driving circuit is in a scanning process of outputting a scanning signal to the 1st pixel row to an Mth pixel row
Yes
No
After the scanning driving circuit outputs the scanning signal to the Mth pixel row
S3
Control the display panel to remain in the first mode
S2
Control the display panel to enter a trigger state, and when the display panel is in the trigger state, scan at least a first subpixel, where a frequency at which the first subpixels are scanned is greater than a first frequency

FIG. 20

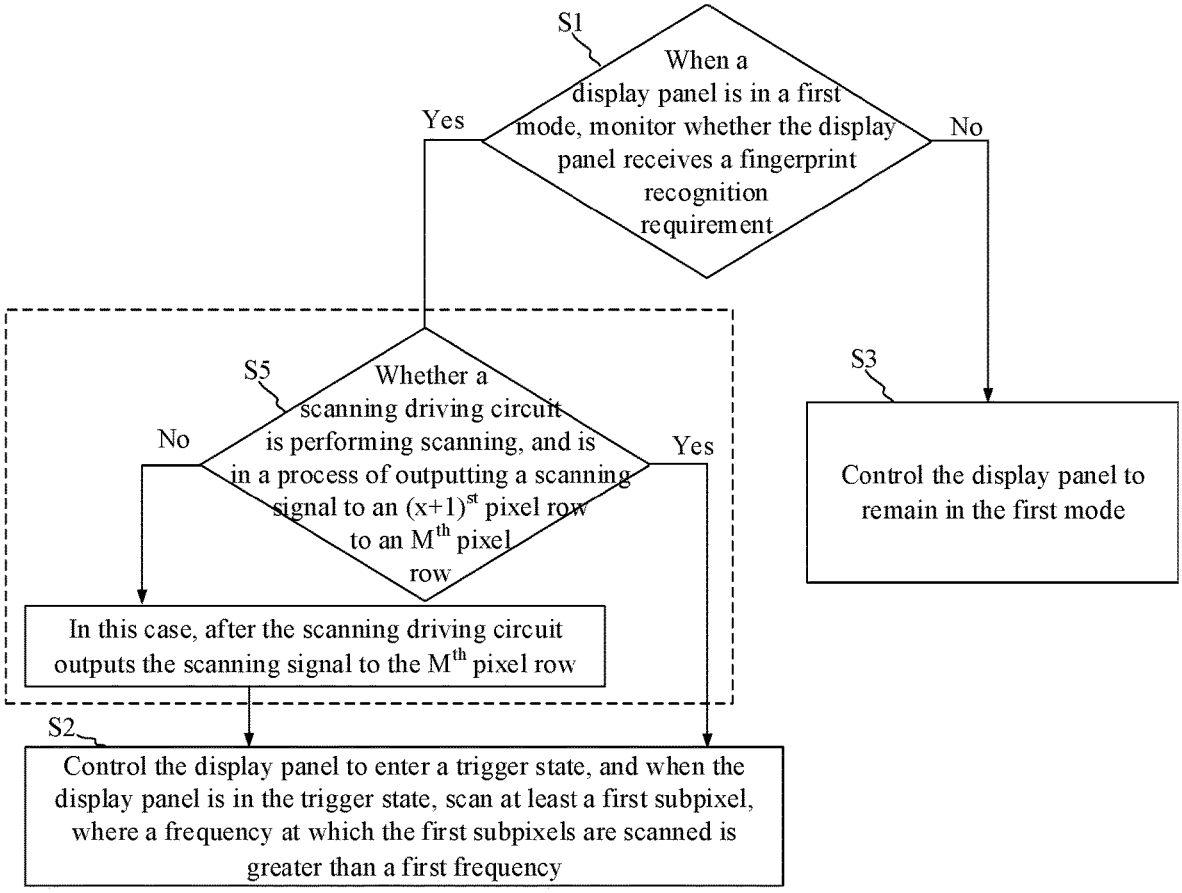

S1
When a display panel is in a first mode, monitor whether the display panel receives a fingerprint recognition requirement
Yes
No
S3
Control the display panel to remain in the first mode
S5
Whether a scanning driving circuit is performing scanning, and is in a process of outputting a scanning signal to an (x+1)st pixel row to an Mth pixel row
No
Yes
In this case, after the scanning driving circuit outputs the scanning signal to the Mth pixel row
S2
Control the display panel to enter a trigger state, and when the display panel is in the trigger state, scan at least a first subpixel, where a frequency at which the first subpixels are scanned is greater than a first frequency

FIG. 21

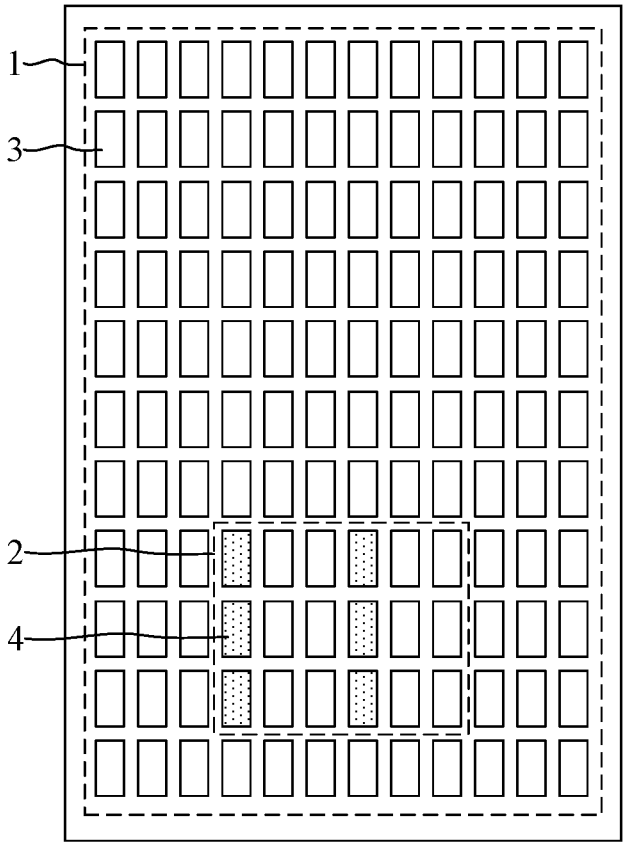


FIG. 22

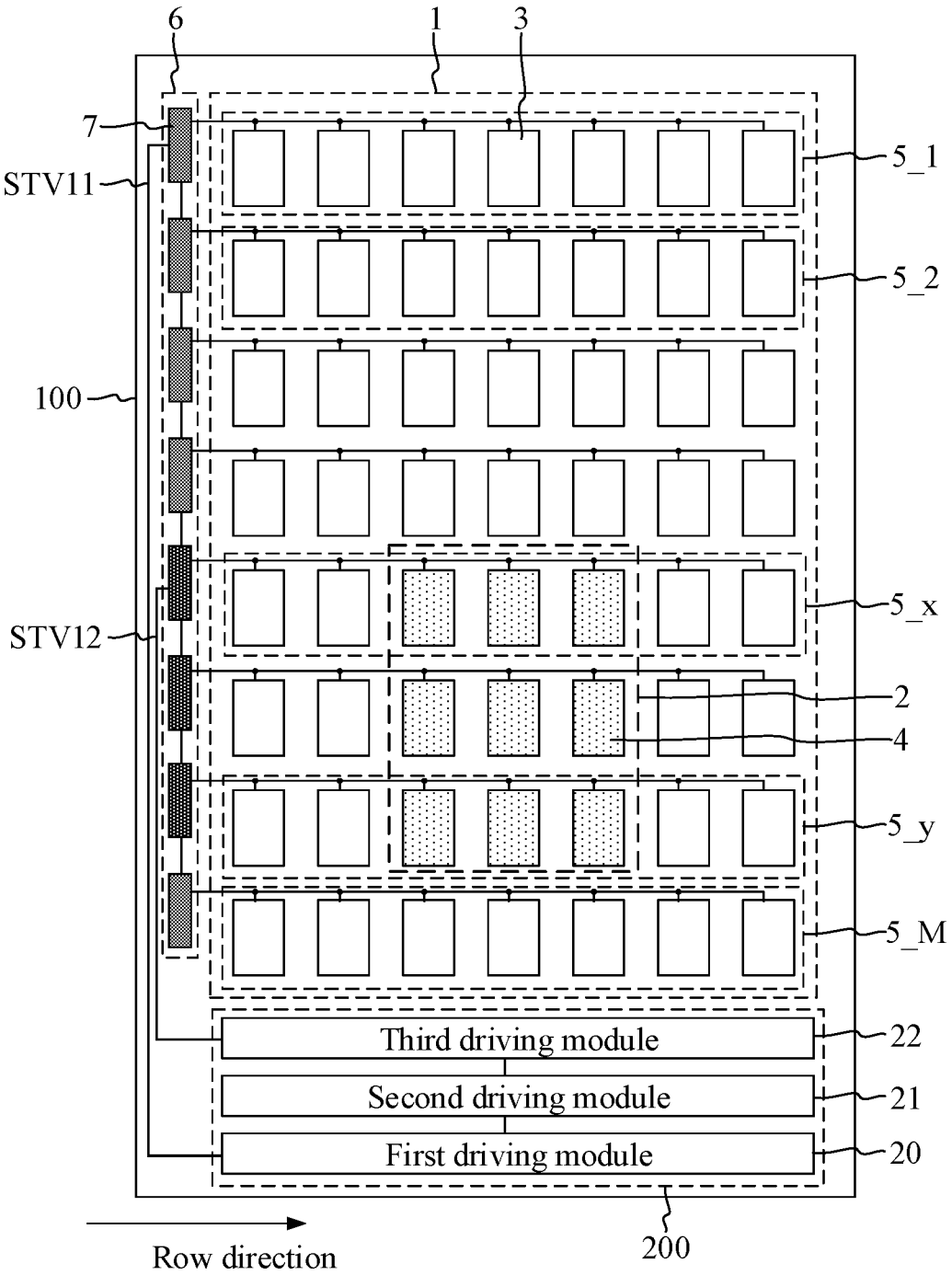

6
1
3
7
STV11
100
STV12
5_1
5_2
5_x
2
4
5_y
5_M
Third driving module
Second driving module
First driving module
22
21
20
200
Row direction

FIG. 23

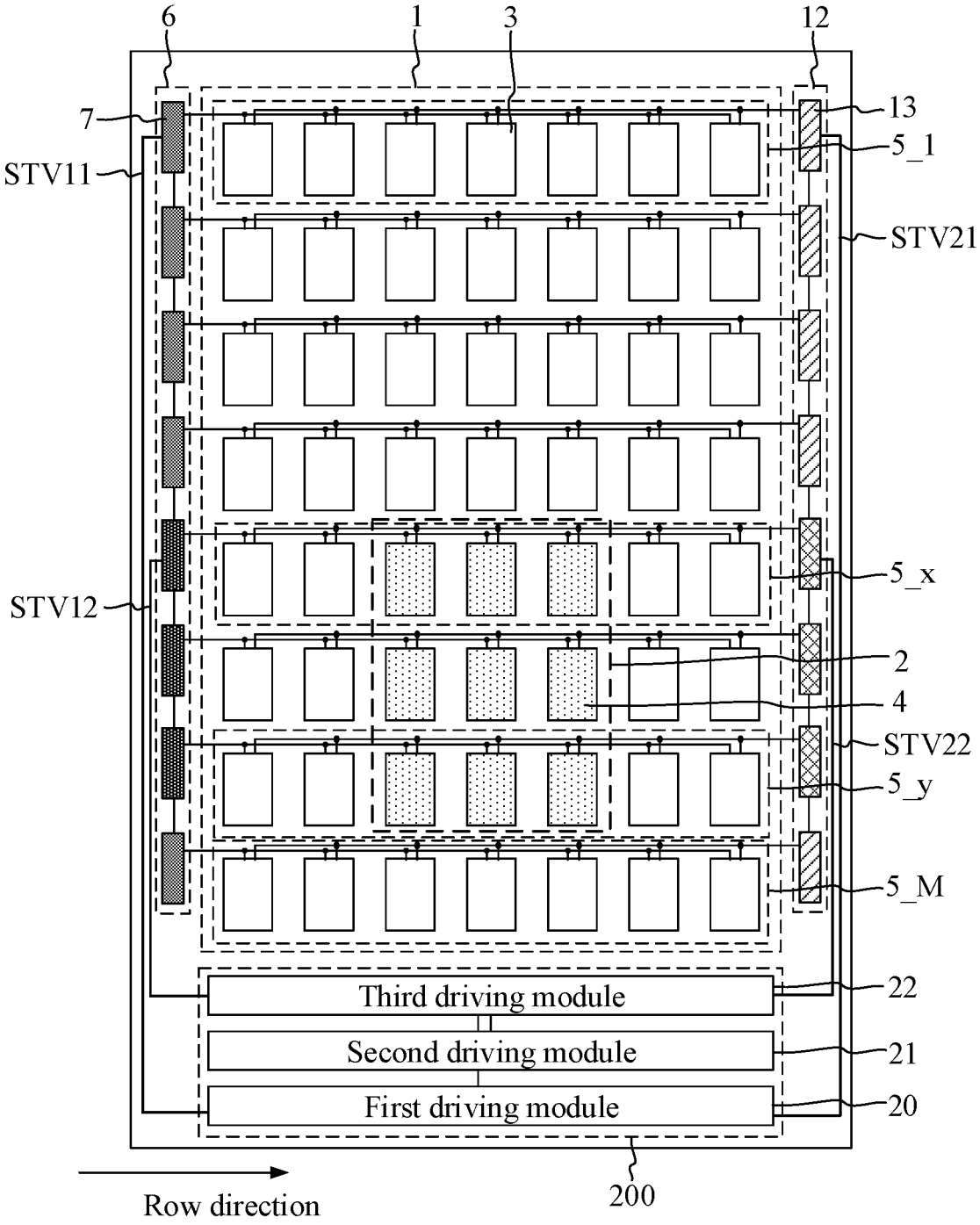

6
1
3
12
7
13
5_1
STV11
STV21
5_x
STV12
2
4
STV22
5_y
5_M
Third driving module
Second driving module
First driving module
22
21
20
200
Row direction

FIG. 24

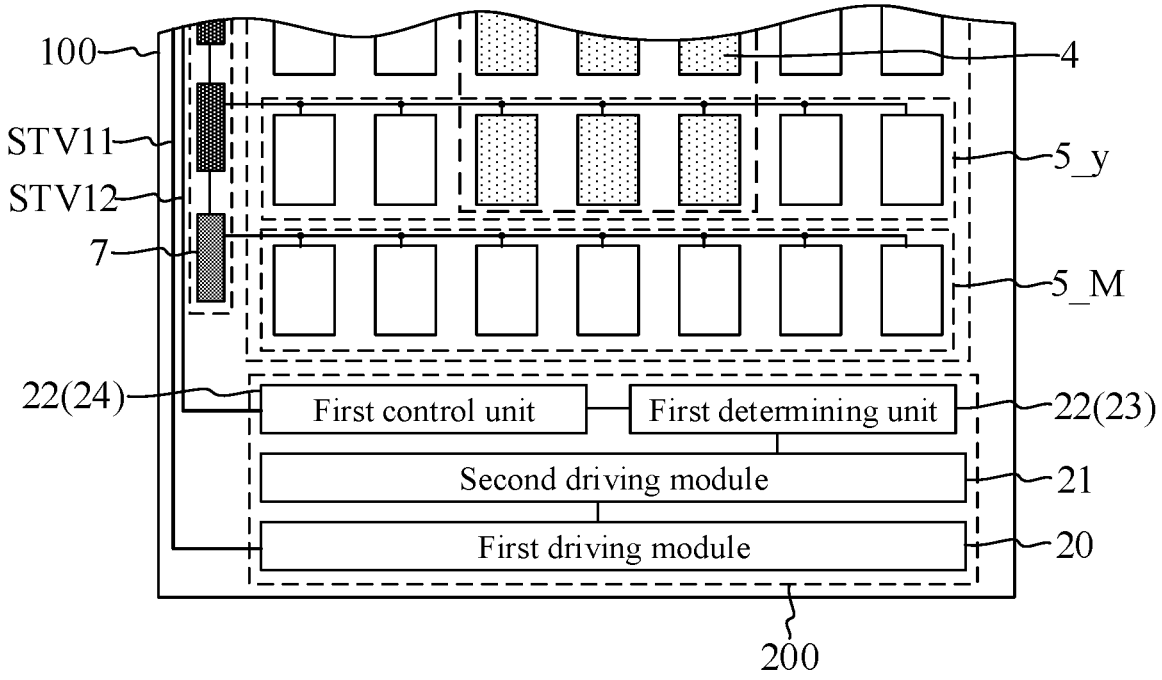

100
4
STV11
5_y
STV12
7
5_M
22(24)
First control unit
First determining unit
22(23)
Second driving module
21
First driving module
20
200

FIG. 25

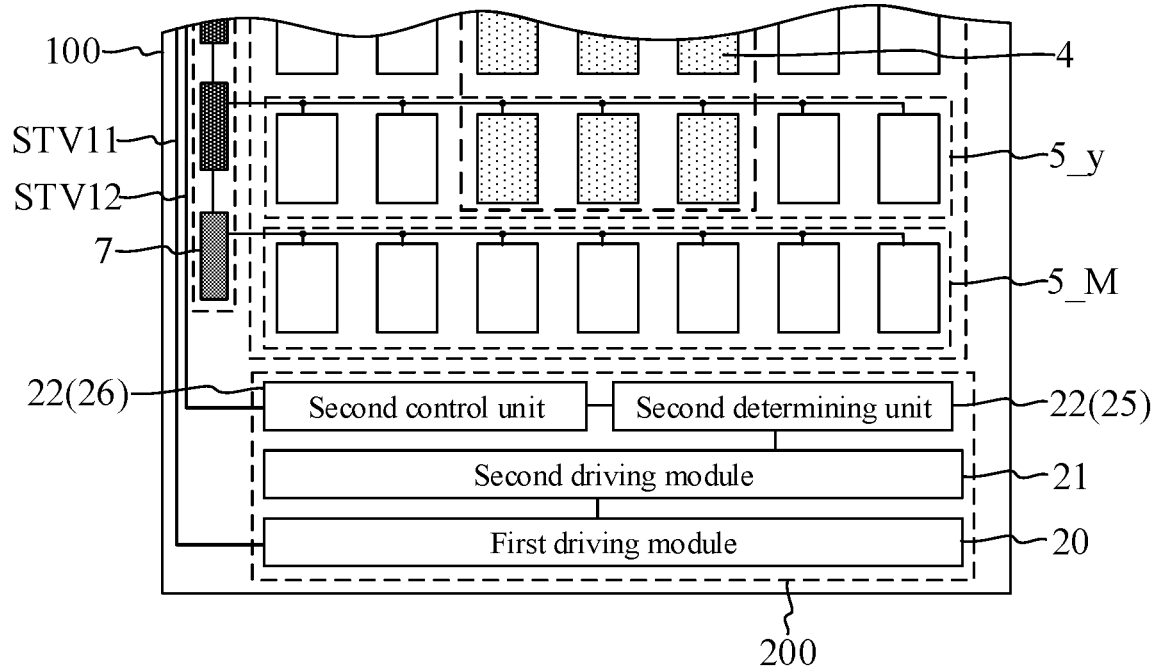

100
4
STV11
5_y
STV12
7
5_M
22(26)
Second control unit
Second determining unit
22(25)
Second driving module
21
First driving module
20
200

FIG. 26

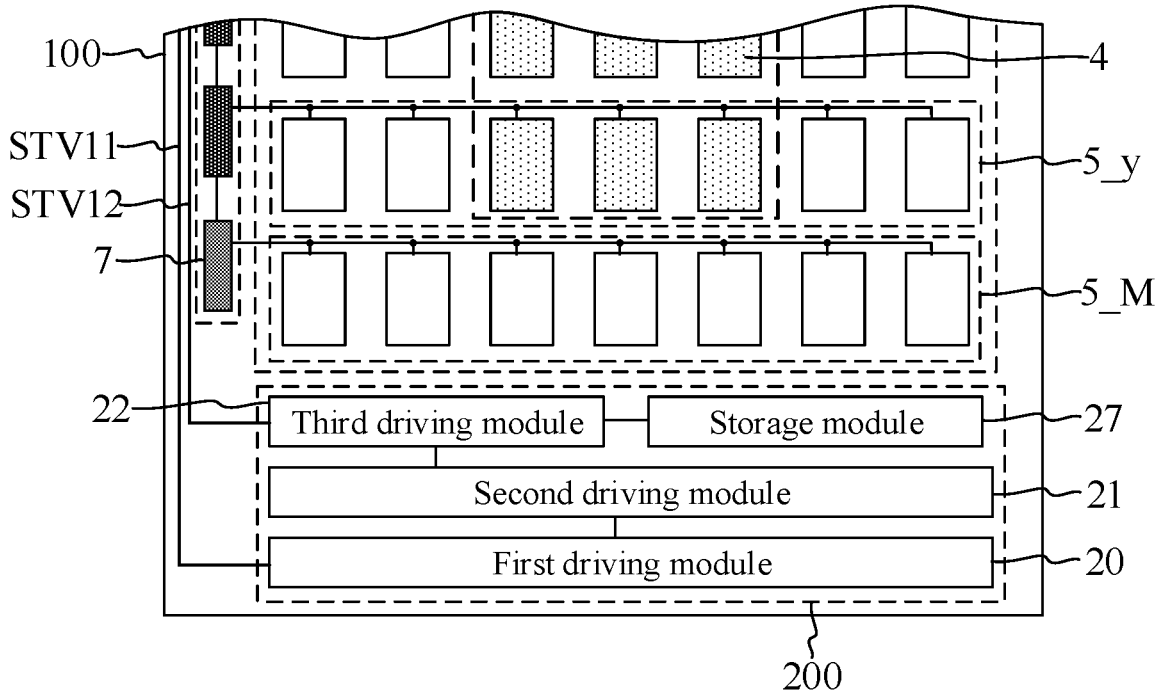

100
4
STV11
5_y
STV12
7
5_M
22
Third driving module
Storage module
27
Second driving module
21
First driving module
20
200

FIG. 27

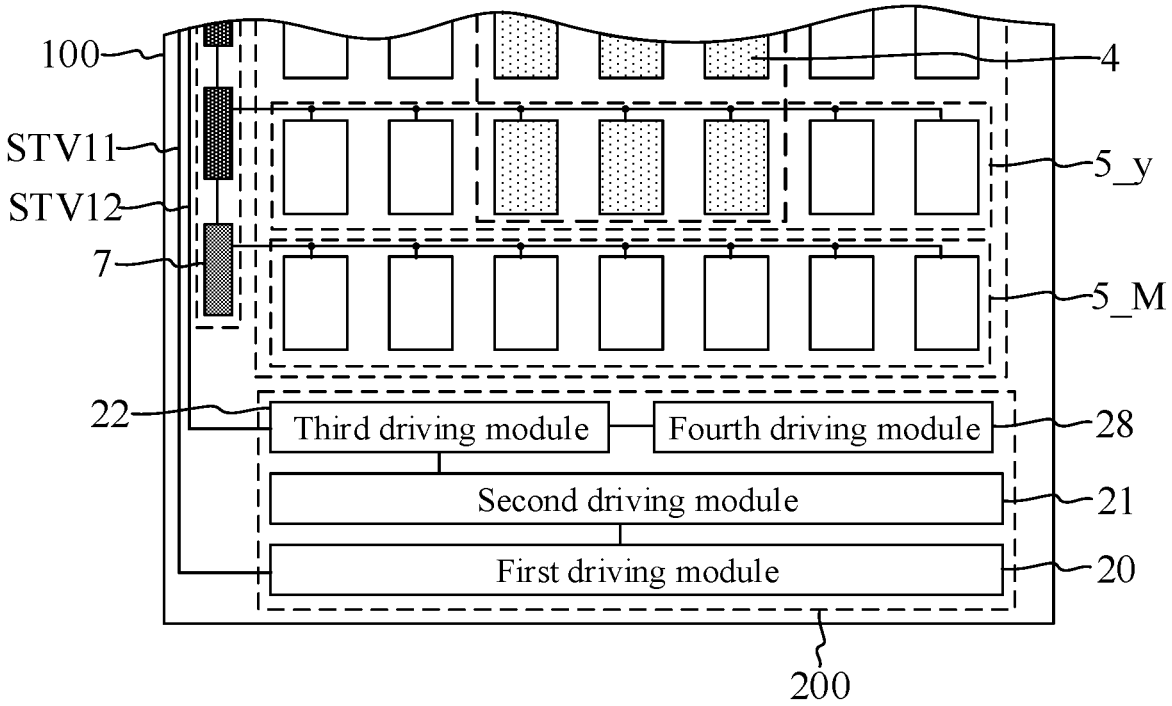

100
4
STV11
5_y
STV12
7
5_M
22
Third driving module
Fourth driving module
28
Second driving module
21
First driving module
20
200

FIG. 28

METHOD FOR DRIVING DISPLAY PANEL AND DISPLAY APPARATUS

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] The present application claims priority to Chinese Patent Application No. 202110481310.X, filed on Apr. 30, 2021, the content of which is incorporated herein by reference in its entirety.

TECHNICAL FIELD

[0002] The present disclosure relates to the field of display technologies, and in particular, to a method for driving a display panel and a display apparatus.

BACKGROUND

[0003] In the under-screen fingerprint recognition technology, a light-emitting element in a display panel is usually used as a fingerprint recognition light source. To improve recognition precision, the light-emitting element used as the fingerprint recognition light source needs have a relatively large brightness. However, when the display panel is in a standby mode or other display mode, it is difficult to meet a requirement on the large brightness of the fingerprint recognition light source.

SUMMARY

[0004] According to one aspect, an embodiment of the present disclosure provides a method for driving a display panel. The display panel has a display region including a fingerprint recognition region and includes subpixels located in the display region, and the subpixels include first subpixels located in the fingerprint recognition region and are used as a light source for fingerprint recognition. The display panel has working modes including a first mode and a second mode. In the first mode, the subpixels are scanned at a first frequency. In the second mode, the subpixels are scanned at a second frequency, and the second frequency is greater than the first frequency. The method includes: when the display panel is in the first mode, monitoring whether the display panel receives a fingerprint recognition requirement, and if it is monitored that the display panel receives the fingerprint recognition requirement, controlling the display panel to enter a trigger state; and when the display panel is in the trigger state, scanning the first subpixels at a frequency greater than the first frequency.

[0005] According to another aspect, an embodiment of the present disclosure provides a display apparatus, and the display apparatus includes a display pane and a driving chip. The display panel has a display region including a fingerprint recognition region and includes subpixels located in the display region, and the subpixels include first subpixels located in the fingerprint recognition region and are used as a light source for fingerprint recognition. The driving chip includes a first driving module, a second driving module electrically connected to the first driving module, and a third driving module electrically connected to the second driving module. The first driving module is configured to control the display panel to be in a first mode in such a manner that the display panel scans the subpixels at a first frequency, or is configured to control the display panel to be in a second mode in such a manner that the display panel scans the subpixels at a second frequency, wherein the second frequency is greater than the first frequency. The second driving module is configured to monitor, when the display panel is in the first mode, whether the display panel receives a fingerprint recognition requirement, and if it is determined that the display panel receives the fingerprint recognition requirement, the second driving module is configured to transmit a trigger instruction. The third driving module is configured to: after receiving the trigger instruction, control the display panel to be in a trigger state in such a manner that the display panel scans the first subpixels at a frequency greater than the first frequency.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] To describe the technical solutions in the embodiments of the present disclosure more clearly, the following briefly describes the accompanying drawings required to be used in the embodiments. The accompanying drawings in the following description show merely some embodiments of the present disclosure, and persons of ordinary skill in the art may still derive other drawings from these accompanying drawings without creative efforts.

[0007] FIG. **1** is a schematic diagram of changes in brightness of a subpixel according to an embodiment of the present disclosure.

[0008] FIG. **2** is a schematic diagram of a display panel according to an embodiment of the present disclosure.

[0009] FIG. **3** is a cross-sectional view of FIG. **2** along a direction A**1**-A**2** according to an embodiment of the present disclosure.

[0010] FIG. **4** is a flowchart of a method for driving a display panel according to an embodiment of the present disclosure.

[0011] FIG. **5** is a schematic diagram of a scanning driving circuit according to an embodiment of the present disclosure.

[0012] FIG. **6** is another flowchart of a method for driving a display panel according to an embodiment of the present disclosure.

[0013] FIG. **7** is still another flowchart of a method for driving a display panel according to an embodiment of the present disclosure.

[0014] FIG. **8** is another schematic diagram of a scanning driving circuit according to an embodiment of the present disclosure.

[0015] FIG. **9** is yet another flowchart of a method for driving a display panel according to an embodiment of the present disclosure.

[0016] FIG. **10** is a schematic diagram of a first suppression module according to an embodiment of the present disclosure.

[0017] FIG. **11** is a schematic diagram of a pixel circuit according to an embodiment of the present disclosure.

[0018] FIG. **12** is a time sequence diagram of a scanning signal and an emission signal according to an embodiment of the present disclosure.

[0019] FIG. **13** is a schematic diagram of an emission driving circuit according to an embodiment of the present disclosure.

[0020] FIG. **14** is yet another flowchart of a method for driving a display panel according to an embodiment of the present disclosure.

[0021] FIG. **15** is another time sequence diagram of a scanning signal and an emission signal according to an embodiment of the present disclosure.

[0022] FIG. **16** is yet another flowchart of a method for driving a display panel according to an embodiment of the present disclosure.

[0023] FIG. **17** is another schematic diagram of an emission driving circuit according to an embodiment of the present disclosure.

[0024] FIG. **18** is yet another flowchart of a method for driving a display panel according to an embodiment of the present disclosure.

[0025] FIG. **19** is a schematic diagram of a second suppression module according to an embodiment of the present disclosure.

[0026] FIG. **20** is yet another flowchart of a method for driving a display panel according to an embodiment of the present disclosure.

[0027] FIG. **21** is yet another flowchart of a method for driving a display panel according to an embodiment of the present disclosure.

[0028] FIG. **22** is another schematic diagram of a display panel according to an embodiment of the present disclosure.

[0029] FIG. **23** is a schematic diagram of a display apparatus according to an embodiment of the present disclosure.

[0030] FIG. **24** is another schematic diagram of a display apparatus according to an embodiment of the present disclosure.

[0031] FIG. **25** is still another schematic diagram of a display apparatus according to an embodiment of the present disclosure.

[0032] FIG. **26** is yet another schematic diagram of a display apparatus according to an embodiment of the present disclosure.

[0033] FIG. **27** is yet another schematic diagram of a display apparatus according to an embodiment of the present disclosure.

[0034] FIG. **28** is yet another schematic diagram of a display apparatus according to an embodiment of the present disclosure.

DETAILED DESCRIPTION

[0035] For a better understanding of the technical solutions of the present disclosure, the following describes in detail the embodiments of the present disclosure with reference to the accompanying drawings.

[0036] It should be noted that, the described embodiments are merely some but not all of the embodiments of the present disclosure. All other embodiments obtained by persons of ordinary skill in the art based on the embodiments of the present disclosure shall fall within the protection scope of the present disclosure.

[0037] Terms used in the embodiments of the present disclosure are only for the purpose of describing specific embodiments, and are not intended to limit the present disclosure. Unless otherwise specified in the context, words, such as "a", "the", and "this", in a singular form in the embodiments of the present disclosure and the appended claims include plural forms.

[0038] It should be understood that, the term "and/or" used in this specification describes only an association relationship of associated objects and represents that three relationships may exist. For example, A and/or B may represent the following three cases: A alone, A and B, and B alone. In addition, the character "/" in this specification generally indicates an "or" relationship between the associated objects.

[0039] A display panel has a plurality of working modes. When the display panel is in a mode such as a standby mode or a static image display mode, to reduce power consumption, the display panel usually scans subpixels at a relatively low frequency.

[0040] A display period of one frame of image of the display panel includes a driving phase and a holding phase. The display panel scans the subpixels row by row in the driving phase, and stops outputting a scanning signal in the holding phase. For low frequency scanning, the holding phase in the display period of one frame of an image is relatively long, and after the subpixel is charged, a subsequent charging can be performed within a display period of a frame of a next image only after a relatively long stagnation time. This causes a relatively stagnant response of the subpixel. In addition, in a low frequency working mode, brightness improvement stagnates when the subpixel changes from a dark state to a bright state. Therefore, if a fingerprint recognition requirement is detected when the display panel performs low frequency scanning, brightness improvement of the subpixel is very slow. Consequently, a recognition response time will be excessively long.

[0041] FIG. **1** is a schematic diagram of changes in brightness of a subpixel according to an embodiment of the present disclosure. When a display panel scans the subpixel at relatively low frequency of 15 Hz, and when a fingerprint recognition requirement is detected at a moment t, brightness of the subpixel can be improved to a brightness L required by fingerprint recognition only in a very slow manner.

[0042] In view of this, an embodiment of the present disclosure provides a method for driving a display panel. FIG. **2** is a schematic diagram of a display panel according to an embodiment of the present disclosure. As shown in FIG. **2**, the display panel has a display region **1** including a fingerprint recognition region **2**, and including a plurality of subpixels **3** located in the display region **1**. The subpixels **3** include a plurality of first subpixels **4** located in the fingerprint recognition region **2**, which are suitable for use as a light source for fingerprint recognition. FIG. **3** is a cross-sectional view of FIG. **2** along a direction A**1**-A**2**. As shown in FIG. **3**, when the display panel performs fingerprint recognition, light emitted by the first subpixels **4** is transmitted to a finger and is reflected by the finger, the reflected light is incident to a fingerprint recognition module **101**. The fingerprint recognition module **101** collects light reflected from different positions, generates an image of a fingerprint at the different positions, and further obtains a complete fingerprint image through combination and analysis.

[0043] FIG. **2** shows an example in which the fingerprint recognition region **2** is a partial region of the display region **1**. In another embodiment of the present disclosure, the fingerprint recognition region **2** can be an entire region of the display region **1**. FIG. **2** shows an example in which the fingerprint recognition region **2** includes three rows and six columns of the subpixels **3**. A quantity and arrangement positions of the subpixels provided in the fingerprint recognition region **2** can be set based on an actual requirement.

[0044] Working modes of the display panel include a first mode and a second mode, in the first mode, the subpixel **3** is scanned at a first frequency; and in the second mode, the subpixel **3** is scanned at a second frequency, and the second frequency is greater than the first frequency. For example, the first mode is a mode in which a scanning frequency is

relatively low, such as a standby mode or a static image display mode, and the second mode is a mode in which a scanning frequency is relatively high, such as a dynamic image display mode.

[0045] FIG. **4** is a flowchart of a method for driving the display panel according to an embodiment of the present disclosure. As shown in FIG. **4**, the method includes step S**1**, step S**2**, and step S**3**.

[0046] At step S**1**, when the display panel is in the first mode, whether the display panel receives the fingerprint recognition requirement is monitored, and if it is monitored that the display panel receives the fingerprint recognition requirement, step S**2** is performed, or if it is monitored that the display panel does not receive the fingerprint recognition requirement, step S**3** is performed.

[0047] At step S**2**, the display panel is controlled to enter a trigger state, and when the display panel is in the trigger state, at least the first subpixels **4** is scanned at a frequency greater than the first frequency.

[0048] At step S**3**, the display panel is controlled to remain in the first mode.

[0049] In the foregoing driving method, when the display panel is in the first mode in which scanning is performed at a relatively low frequency, if the display panel receives the fingerprint recognition requirement, the display panel scans the first subpixels **4** in the fingerprint recognition region **2** at a frequency greater than the first frequency, so that a refresh frequency of the first subpixels **4** in the fingerprint recognition region **2** can be increased. After being charged, the first subpixels **4** can be charged for a second time within a display period of a next frame of image with only a relatively short pause time, thereby quickly improving brightness of the first subpixels **4**.

[0050] In this embodiment of the present disclosure, after the display panel receives the fingerprint recognition requirement, a process of quickly improving the brightness of the first subpixels **4** is added, which not only shortens a fingerprint recognition response time and enhances user experience, but also quickly improves overall brightness of the fingerprint recognition region **2**. In subsequent fingerprint recognition, more light is incident to a finger through the fingerprint recognition region **2**, and a fingerprint image acquired by a fingerprint recognition module is clearer, so that recognition precision of the fingerprint is higher.

[0051] FIG. **5** is a schematic diagram of a scanning driving circuit **6** according to an embodiment of the present disclosure. In an embodiment, as shown in FIG. **5**, the display panel further includes M pixel rows **5** (for clear illustration, in FIG. **5**, a reference sign of an a^{th} pixel row **5** is represented by **5**_*a*, where a=1, . . . , and M). Each pixel row **5** includes a plurality of subpixels **3** arranged along a row direction. The first subpixels **4** are located in an x^{th} pixel row **5** to a y^{th} pixel row **5**, where $1 \le x < y \le M$, and M is a positive integer greater than 1. The display panel can further include a scanning driving circuit **6**, and the scanning driving circuit **6** is electrically connected to a first scanning frame start signal line STV**11**, a second scanning frame start signal line STV**12**, and the M pixel rows **5**.

[0052] FIG. **6** is another flowchart of a method for driving the display panel according to an embodiment of the present disclosure. When the display panel is in the first mode, the scanning driving circuit **6** successively outputs, in response to a first scanning frame start signal, a scanning signal to the 1^{st} pixel row **5** to an M^{th} pixel row **5** at the first frequency, to implement normal light-emitting of the subpixels **3** in the entire display region **1**. When the display panel is in the trigger state, the scanning driving circuit **6** successively outputs, in response to a second scanning frame start signal, the scanning signal to at least the x^{th} pixel row **5** to the y^{th} pixel row **5** at a frequency greater than the first frequency, to improve a refresh frequency of the first subpixels **4** in the x^{th} pixel row **5** to the y^{th} pixel row **5**, to enable brightness of the first subpixels **4** to be quickly improved to brightness required by fingerprint recognition.

[0053] The following uses two types of structures of the scanning driving circuit **6** as an example, to provide two driving manners of the scanning driving circuit **6** for description.

[0054] First Driving Manner:

[0055] Referring to FIG. **5** again, the scanning driving circuit **6** can include N**1** cascaded first scanning shift units **7** electrically connected to the M pixel rows **5**, and an i^{th} first scanning shift unit **7** is electrically connected to the x^{th} pixel row **5**, where N**1** is a positive integer greater than 1, and $1 \le i < N1$. The first scanning frame start signal line STV**11** is electrically connected to the 1^{st} first scanning shift unit **7**, and the second scanning frame start signal line STV**12** is electrically connected to the i^{th} first scanning shift unit **7**.

[0056] It should be noted that a quantity N**1** of the first scanning shift units **7** and a quantity M of the pixel rows **5** can be the same or may be different. FIG. **5** shows an example in which N**1**=M. When N**1**=M, the N**1** cascaded first scanning shift units **7** are electrically connected to the M pixel rows **5** in a one-to-one correspondence. In another embodiment of the present disclosure, it can be set that

$$N1 = \frac{M}{2},$$

and in this case, one first scanning shift unit **7** is electrically connected to two pixel rows **5**.

[0057] FIG. **7** is still another flowchart of a driving method according to an embodiment of the present disclosure. A process in which the scanning driving circuit **6** outputs the scanning signal to the 1^{st} pixel row **5** to the M^{th} pixel row **5** includes: the first scanning frame start signal line STV**11** provides an effective level, and the second scanning frame start signal line STV**12** provides a non-effective level, to control the N**1** first scanning shift units **7** to successively output the scanning signal to the 1^{st} pixel row **5** to the M^{th} pixel row **5**. A process in which the scanning driving circuit **6** outputs the scanning signal to at least the x^{th} pixel row to the y^{th} pixel row **5** includes: the second scanning frame start signal line STV**12** provides an effective level, to control the i^{th} first scanning shift unit **7** to an $(N1)^{th}$ first scanning shift unit **7** to successively output the scanning signal to the x^{th} pixel row **5** to the M^{th} pixel row **5**.

[0058] In the foregoing driving manner, in one aspect, a circuit structure of the scanning driving circuit **6** does not need to be changed, and only one second scanning frame start signal line STV**12** connected to the i^{th} first scanning shift unit **7** needs to be additionally provided, so that in the trigger state, the i^{th} first scanning shift unit **7** to the $(N1)^{th}$ first scanning shift unit **7** independently scan the x^{th} pixel row **5** to the M^{th} pixel row **5**. This driving manner simplifies a structure design of the scanning driving circuit **6**, and avoids a case in which the scanning driving circuit **6**

occupies a relatively large bezel width in the display panel. This is more conducive to implementation of a narrow bezel design of the display panel. In another aspect, in the trigger state, in the foregoing driving manner, only the x^{th} pixel row **5** to the M^{th} pixel row **5** are scanned at a relatively high frequency. Compared with a case in which an entire screen is switched to high frequency scanning, this reduces power consumption, and further shortens a brightness improvement time of the fingerprint recognition region **2**.

[0059] Second Driving Manner:

[0060] FIG. **8** is another schematic diagram of a scanning driving circuit **6** according to an embodiment of the present disclosure. As shown in FIG. **8**, the scanning driving circuit **6** can include a first scanning driving circuit **8** and a second scanning driving circuit **9**. The first scanning driving circuit **8** includes N**1** cascaded second scanning shift units **10**. The N**1** second scanning shift units **10** are electrically connected to the M pixel rows **5**, and N**1** is a positive integer greater than 1. The second scanning driving circuit **9** includes N**2** cascaded third scanning shift units **11**. The N**2** third scanning shift units **11** are electrically connected to the x^{th} pixel row **5** to the y^{th} pixel row **5**, and N**2** is a positive integer greater than 1.

[0061] The first scanning frame start signal line STV**11** is electrically connected to the 1^{st} second scanning shift unit **10** in the first scanning driving circuit **8**, and the second scanning frame start signal line STV**12** is electrically connected to the 1^{st} third scanning shift unit **11** in the second scanning driving circuit **9**.

[0062] It should be noted that a quantity N**1** of the second scanning shift units **10** and the quantity M of the pixel rows **5** may be the same or may be different, and a quantity N**2** of the third scanning shift units **11** and a quantity (y−x+1) of the x^{th} pixel row **5** to the y^{th} pixel row **5** may be the same or may be different. FIG. **8** shows an example in which N**1**=M and N**2**-*y*−x+1. When N**1**=M, the N**1** cascaded second scanning shift units **10** are electrically connected to the M pixel rows **5** in a one-to-one correspondence. When N**2**=y−x+1, the N**2** cascaded third scanning shift units **11** are electrically connected to the x^{th} pixel row **5** to the y^{th} pixel row **5** in a one-to-one correspondence. In another embodiment of the present disclosure,

$$N1 = \frac{M}{2} \text{ and } N2 = \frac{y - x + 1}{2},$$

and in this case, one second scanning shift unit **10** is electrically connected to two pixel rows **5**, and one third scanning shift unit **11** is also electrically connected to two pixel rows **5**.

[0063] FIG. **9** is yet another flowchart of a driving method according to an embodiment of the present disclosure. A process in which the scanning driving circuit **6** outputs the scanning signal to the 1^{st} pixel row **5** to the M^{th} pixel row **5** includes: The first scanning frame start signal line STV**11** provides an effective level, to control the N**1** second scanning shift units **10** in the first scanning driving circuit **8** to successively output the scanning signal to the 1^{st} pixel row **5** to the M^{th} pixel row **5**. A process in which the scanning driving circuit **6** outputs the scanning signal to at least the x^{th} pixel row **5** to the y^{th} pixel row **5** includes: The second scanning frame start signal line STV**12** provides an effective level, to control the N**2** third scanning shift units **11** in the second scanning driving circuit **9** to successively output the scanning signal to the x^{th} pixel row **5** to the y^{th} pixel row **5**.

[0064] In the foregoing driving manner, the second scanning driving circuit **9** can independently scan the x^{th} pixel row **5** to the y^{th} pixel row **5**, and a scanning manner is more flexible. When y<M, in the trigger state, the display panel can perform high frequency scanning only on the x^{th} pixel row **5** to the y^{th} pixel row **5**, and does not need to scan the y^{th} pixel row **5** to the M^{th} pixel row **5**, which reduces power consumption and shortens a brightness improvement time of the fingerprint recognition region **2**.

[0065] With such a driving manner, in the trigger state, a limitation on a setting position of the fingerprint recognition region **2** is relatively small, and the fingerprint recognition region **2** is not limited to be set on a bottom portion of the display region **1**, because high frequency scanning is performed only on pixel rows **5** in which the first subpixels **4** are located, and the last pixel row does not need to be scanned. Even if the fingerprint recognition region **2** is set on a top portion or in the middle of the display region **1**, the brightness improvement time is not affected, which improves flexibility of the setting position of the fingerprint recognition region **2**.

[0066] FIG. **10** is a schematic diagram a first suppression module **19** according to an embodiment of the present disclosure. In an implementation, as shown in FIG. **10**, the second scanning frame start signal line STV**12** is connected to the first suppression module **19** in series. In a process in which the scanning driving circuit **6** successively outputs, in response to the first scanning frame start signal, the scanning signal to the 1^{st} pixel row **5** to the M^{th} pixel row **5**, the first suppression module **19** is configured to suppress signal transmission on the second scanning frame start signal line STV**12**, to avoid a case in which the scanning driving circuit **6** is driven by the second scanning frame start signal in this process, thereby improving reliability of a working state of the display panel.

[0067] To realize a normal light emission of the subpixel **3**, the subpixel **3** can be driven by an emission signal in addition to be driven by the scanning signal. A pixel circuit shown in FIG. **11** is taken as an example. With reference to a signal time sequence diagram shown in FIG. **12**, a pixel circuit in the subpixels **3** can include a capacitor C, and a first transistor T**1** to a seventh transistor T**7**. One driving period of the pixel circuit includes an initialization period t**1**, a charging period t**2**, and a light-emitting control period t**3**. In the initialization period t**1**, the fifth transistor T**5** and the seventh transistor T**7** respectively reset, in response to a first scanning signal Scan**1**, a gate of the third transistor T**3** and an anode of a light emitting diode D by using a reset signal Vref. In the charging period t**2**, the second transistor T**2** and the fourth transistor T**4** write, in response to a second scanning signal Scan**2**, a data signal Data to the third transistor T**3**. In the light-emitting control period t**3**, the first transistor T**1** and the sixth transistor T**6** control, in response to an emission signal Emit, the light emitting diode D to emit light under function of a driving current converted by the data signal Data and a power supply signal PVDD, where a current flowing to the light emitting diode D is

$$I = \frac{1}{2}\mu_n C_{OX} \frac{W}{L}(V_{PVDD} - V_{Data})^2,$$

μ_n denotes an electron migration rate, C_{ox} denotes a capacitance per unit area at a gate oxide layer,

$$\frac{W}{L}$$

denotes a width-to-length ratio of channels of the third transistor T3, V_{PVDD} denotes a power supply voltage, and V_{Data} is a data voltage.

[0068] FIG. **13** is a schematic diagram of an emission driving circuit **12** according to an embodiment of the present disclosure, the display panel further includes the emission driving circuit **12**, and the emission driving circuit **12** is electrically connected to a first emission frame start signal line STV**21**, a second emission frame start signal line STV**22**, and the M pixel rows **5**.

[0069] Based on the foregoing structure, FIG. **14** illustrates another flowchart of a method for driving a display panel according to an embodiment of the present disclosure. As shown in FIG. **14**, when the display panel is in the first mode, the method further includes: successively outputting, by the emission driving circuit **12**, in response to a first emission frame start signal, an emission signal to the 1^{st} pixel row **5** to the M^{th} pixel row **5**. When the display panel enters the trigger state, the method further includes: successively outputs, by the emission driving circuit **12**, in response to a second emission frame start signal, the emission signal to at least the x^{th} pixel row **5** to the y^{th} pixel row **5**, to realize normal light-emitting of the subpixel **3**.

[0070] FIG. **15** is another time sequence diagram of a scanning signal and an emission signal according to an embodiment of the present disclosure, where L represents brightness of the fingerprint recognition region **2**. As shown in FIG. **15**, when the display panel is in the first mode, a frequency at which the emission driving circuit **12** outputs the emission signal Emit can be greater than a frequency at which the scanning driving circuit **6** outputs the scanning signal Scan, which can ensure that the emission driving circuit **12** has a relatively high driving frequency, and avoid occurrence of a flicker phenomenon of a screen. When the display panel enters the trigger state, because a frequency at which the scanning driving circuit **6** scans the first subpixels **4** is relatively high, a frequency at which the emission driving circuit **12** outputs the emission signal Emit may be equal to a frequency at which the scanning driving circuit **6** scans the first subpixels **4**.

[0071] The following uses two types of structures of the emission driving circuit **12** as an example, to provide two driving manners of the emission driving circuit **12** for description.

[0072] First Driving Manner:

[0073] Referring to FIG. **13** again, the emission driving circuit **12** can include N**1'** cascaded first emission shift units **13**. The N**1'** first emission shift units **13** are electrically connected to the M pixel rows **5**, and an i'^{th} first emission shift unit **13** is electrically connected to the x^{th} pixel row **5**, where N**1'** is a positive integer greater than 1, and $1 \le i' < N1'$. The first emission frame start signal line STV**21** is electrically connected to the 1^{st} first emission shift unit **13**, and the second emission frame start signal line STV**22** is electrically connected to the i'^{th} first emission shift unit **13**.

[0074] A quantity N**1'** of the first emission shift units **13** and the quantity M of the pixel rows **5** can be the same or be different from each other. FIG. **13** shows an example in which N**1'**=M. When N**1'**=M, the N**1'** cascaded first emission shift units **13** are electrically connected to the M pixel rows **5** in a one-to-one correspondence. In another embodiment of the present disclosure,

$$N1' = \frac{M}{2},$$

and in this case, one first emission shift unit **13** is electrically connected to two pixel rows **5**.

[0075] Based on the foregoing structure, FIG. **16** illustrates yet another flowchart of a method for driving a display panel according to an embodiment of the present disclosure. As shown in FIG. **16**, a process in which the emission driving circuit **12** outputs the emission signal to the 1^{st} pixel row **5** to the M^{th} pixel row **5** can include: providing, by the first emission frame start signal line STV**21**, an effective level, and providing, by the second emission frame start signal line STV**22**, a non-effective level, to control the N**1'** first emission shift units **13** to successively output the emission signal to the 1^{st} pixel row **5** to the M^{th} pixel row **5**. A process in which the emission driving circuit **12** outputs the emission signal to at least the x^{th} pixel row to the y^{th} pixel row can include: providing, by the second emission frame start signal line STV**22**, an effective level, to control the i^{th} first emission shift unit **13** to an $N1'^{th}$ first emission shift unit **13** to successively output the emission signal to the x^{th} pixel row **5** to the M' pixel row **5**.

[0076] With the foregoing driving manner, a circuit structure of the emission driving circuit **12** does not need to be changed, and only one second emission frame start signal line STV**22** connected to the i'^{th} first emission shift unit **13** needs to be additionally provided, so that in the trigger state, the it first emission shift unit **13** to the $(N1')^{th}$ first emission shift unit **13** independently driving the x^{th} pixel row **5** to the M^{th} pixel row **5**. This driving manner simplifies a structure design of the emission driving circuit **12**, and further avoids a case in which the emission driving circuit **12** occupies a relatively large bezel width in the display panel. This is more conducive to implementation of a narrow bezel design of the display panel.

[0077] Second Driving Manner:

[0078] FIG. **17** is another schematic diagram of an emission driving circuit **12** according to an embodiment of the present disclosure. As shown in FIG. **17**, the emission driving circuit **12** includes a first emission driving circuit **14** and a second emission driving circuit **15**. The first emission driving circuit **14** includes N**1'** cascaded second emission shift units **16**. The N**1'** second emission shift units **16** are electrically connected to the M pixel rows **5**, and N**1'** is a positive integer greater than 1. The second emission driving circuit **15** includes N**2'** cascaded third emission shift units **17**. The N**2'** third emission shift units **17** are electrically connected to the x^{th} pixel row **5** to the y^{th} pixel row **5**, and N**2'** is a positive integer greater than 1.

[0079] The first emission frame start signal line STV**21** can be electrically connected to the 1^{st} second emission shift unit **16** in the first emission driving circuit **14**, and the second emission frame start signal line STV**22** can be electrically connected to the 1^{st} third emission shift unit **17** in the second emission driving circuit **15**.

[0080] It should be noted that a quantity N**1'** of the second emission shift units **16** and the quantity M of the pixel rows **5** can be the same or be different from each other, and a quantity N**2'** of the third emission shift units **17** and the quantity (y−x+1) of the x^{th} pixel row **5** to the y^{th} pixel row **5** can be the same or be different from each other. FIG. **17** shows an example in which N**1'**=M and N**2'**=y−x+1. When N**1'**=M and N**2'**=y−x+1, the N**1'** cascaded second emission shift units **16** are electrically connected to the M pixel rows **5** in a one-to-one correspondence, and the N**2'** cascaded third emission shift units **17** are electrically connected to the x^{th} pixel row **5** to the y^{th} pixel row **5** in a one-to-one correspondence. In another embodiment of the present disclosure,

$$N1' = \frac{M}{2} \text{ and } N2' = \frac{y-x+1}{2},$$

and in this case, one second emission shift unit **16** is electrically connected to two pixel rows **5**, and one third emission shift unit **17** is also electrically connected to two pixel rows **5**.

[0081] Based on the foregoing structure, FIG. **18** illustrates yet another flowchart of a method for driving a display panel according to an embodiment of the present disclosure. As shown in FIG. **18**, a process in which the emission driving circuit **12** outputs the emission signal to the 1^{st} pixel row **5** to the M^{th} pixel row **5** can include: providing, by the first emission frame start signal line STV**21**, an effective level, to control the N**1'** second emission shift units **16** in the first emission driving circuit **14** to successively output the emission signal to the 1^{st} pixel row **5** to the M^{th} pixel row **5**. A process in which the emission driving circuit **12** outputs the emission signal to at least the x^{th} pixel row to the y^{th} pixel row can include: providing, by the second emission frame start signal line STV**22**, an effective level, to control the N**2'** third emission shift units in the second emission driving circuit **15** to successively output the emission signal to the x^{th} pixel row **5** to the y^{th} pixel row.

[0082] In the foregoing driving manner, when y<M, in the trigger state, the second emission driving circuit **15** independently drives only pixel rows **5** in which the first subpixels **4** are located, and does not need to drive the last pixel row. The driving manner is more flexible, and further reduces power consumption.

[0083] FIG. **19** is a schematic diagram a second suppression module **18** according to an embodiment of the present disclosure. In an embodiment, as shown in FIG. **19**, the second emission frame start signal line STV**22** is connected to the second suppression module **18** in series. In a process in which the emission driving circuit **12** successively outputs, in response to the first emission frame start signal, the emission signal to the 1^{st} pixel row **5** to the M^{th} pixel row **5**, the second suppression module **18** is configured to suppress signal transmission on the second emission frame start signal line STV**22**, to avoid a case in which the emission driving circuit **12** is driven by the second emission frame start signal in this process, thereby improving reliability of a working state of the display panel.

[0084] FIG. **20** is yet another flowchart of a driving method according to an embodiment of the present disclosure. In an embodiment, as shown in FIG. **20**, when it is monitored that the display panel receives a fingerprint recognition requirement, the method for driving the display panel further includes step S**4**.

[0085] At step S**4**, whether the scanning driving circuit **6** is in a scanning process during which the scanning driving circuit **6** outputs the scanning signal to the 1^{st} pixel row **5** to the M^{th} pixel row **5**, is determined, and if it is determined that the scanning driving circuit **6** is in the scanning process, the scanning driving circuit **6** are waited for to output the scanning signal to the M^{th} pixel row **5** and then the step S**2** is performed; or if it is determined that the scanning driving circuit **6** is not in the scanning process, step S**2** is directly performed.

[0086] When it is monitored that the display panel receives the fingerprint recognition requirement, in this embodiment of the present disclosure, a scanning status of the scanning driving circuit **6** is determined. The scanning driving circuit **6** enters the trigger state only after outputting the scanning signal to the M^{th} pixel row **5**, and triggering can be performed within a holding period in a display time of one frame of image. A scanning process in the first mode and a scanning process in the trigger state are mutually staggered, and in the trigger state, a data line transmits a data signal to only one pixel row **5** of the x^{th} pixel row to the M^{th} pixel row or the x^{th} pixel row to the y^{th} pixel row at a same moment, to improve transmission accuracy of the data signal, thereby avoiding impact, on display and brightness improvement of the display panel, caused by chaotic transmission of the data signal.

[0087] FIG. **21** is yet another flowchart of a driving method according to an embodiment of the present disclosure. In another embodiment, as shown in FIG. **21**, when it is monitored that the display panel receives the fingerprint recognition requirement, the method further includes step S**5**.

[0088] At step S**5**, whether the scanning driving circuit **6** is performing scanning and is in a scanning process where the scanning driving circuit **6** outputs the scanning signal to an $(x+1)^{th}$ pixel row **5** to the M^{th} pixel row **5** is determined. If it is determined that the scanning driving circuit **6** is performing scanning and is in the scanning process, step S**2** is directly performed, or if it is determined that the scanning driving circuit **6** is not performing scanning or is not in the scanning process, the scanning driving circuit **6** is delayed to output the scanning signal to the M^{th} pixel row **5** and then step S**2** is performed.

[0089] In the foregoing driving manner, after receiving the fingerprint recognition requirement, the scanning driving circuit **6** can directly enter the trigger state in the scanning process where the scanning driving circuit **6** outputs the scanning signal to the $(x+1)^{th}$ pixel row **5** to the M^{th} pixel row **5**, to shorten a time interval between receiving the fingerprint recognition requirement and entering the trigger state, thereby shortening a recognition response time to some extent.

[0090] In the foregoing driving manner, scanning in the trigger state is directly performed when scanning in the first mode does not end. Although a case in which the data line simultaneously transmits the data signal to two pixel rows **5** occurs, because the first subpixels **4** in the trigger state are refreshed at a very high rate, the data signal on the data line is also refreshed very quickly, and the data signal transmitted on the data line does not remain at a fixed electric potential for an excessively long time. Therefore, image display and brightness improvement are not severely affected. Com-

pared with that scanning in the trigger state is performed when the scanning driving circuit **6** outputs the scanning signal to the 1^{st} pixel row **5** to the x^{th} pixel row **5**, in the foregoing driving manner, scanning in the trigger state is performed only after scanning performed by the scanning driving circuit **6** on the x^{th} pixel row **5** ends. A quantity of remaining pixel rows **5** that are not scanned in the scanning process in the first mode is relatively small. Therefore, in the trigger state, there are relatively few cases in which the data line simultaneously transmits the data signal to two pixel rows **5**, so that impact of the data signal on image display and brightness improvement is smaller.

[0091] One time of scanning process in which the scanning driving circuit **6** successively outputs, in response to the second scanning frame start signal, the scanning signal to at least the x^{th} pixel row **5** to the y^{th} pixel row **5** is one time of high frequency scanning. In an embodiment, the method further includes: pre-storing a quantity n of times of high frequency scanning, where n is a positive integer greater than or equal to 1, for example, n=2 or n=3; and performing n times of high frequency scanning on the first subpixels **4** when the display panel is in the trigger state.

[0092] The quantity of times n in which high frequency scanning is preset, so that after entering the trigger state, the display panel directly performs n times of high frequency scanning on the first subpixels **4**. In this case, the fingerprint recognition region **2** can achieve a required brightness threshold. There is no need to monitor in real-time, in the trigger state, brightness of the fingerprint recognition region **2**, and a driving manner is simpler and more convenient.

[0093] In an embodiment, when n>1, in processes of the n times of high frequency scanning, the first subpixels **4** can be scanned at a same frequency. For example, in the n times of high frequency scanning, the first subpixels **4** are refreshed at relatively high frequency of 120 Hz. In this case, a refresh frequency of the fingerprint recognition region **2** is relatively high, and brightness of the fingerprint recognition region **2** can be more quickly improved to the brightness threshold required by fingerprint recognition.

[0094] In an embodiment, when n>1, in processes of at least two times of high frequency scanning, the first subpixels **4** are scanned at different frequencies. For example, in the trigger state, scanning can be alternately performed at frequencies of 120 Hz and 100 Hz. In this case, an equivalent refresh frequency of the fingerprint recognition region **2** is slightly lower, so that power consumption is further reduced to some extent while the brightness of the fingerprint recognition region **2** is quickly improved.

[0095] In an embodiment, when n>1 and the display panel is in the trigger state, the method further includes: successively outputting, by the scanning driving circuit **6** in response to the first scanning frame start signal, the scanning signal to the 1^{st} pixel row **5** to the M^{th} pixel row **5**; and after a k^{th} time of high frequency scanning ends, determining whether the scanning driving circuit **6** is in a scanning process where the scanning driving circuit **6** outputs the scanning signal to the 1^{st} pixel row **5** to the M^{th} pixel row **5**, and if it is determined that the scanning driving circuit **6** is in the scanning process, waiting for the scanning driving circuit **6** to output the scanning signal to the M^{th} pixel row **5** and then performing a $(k+1)^{th}$ time of high frequency scanning, or if it is determined that the scanning driving circuit **6** is not in the scanning process, directly performing a $(k+1)^{th}$ time of high frequency scanning, where k=1, . . . , and n−1.

[0096] When the display panel is in the trigger state, the scanning driving circuit **6** is enabled to simultaneously scan the 1^{st} pixel row **5** to the M^{th} pixel row **5**, to enable the display region **1** to still maintain normal display of an image. For example, when the display panel displays an image, the display panel enters the trigger state, and when performing high frequency scanning on the first subpixels **4** in the fingerprint recognition region **2**, the scanning driving circuit **6** can still perform synchronous scanning on the M pixel rows **5** in the display region **1**. Therefore, in a trigger period, the display panel can still continue to display the image. Each time after high frequency scanning ends, a scanning status of the scanning driving circuit **6** is determined, and the scanning driving circuit **6** performs next time of high frequency scanning only after outputting the scanning signal to the M^{th} pixel row **5**, which improves accuracy of a data signal wrote to a pixel row, and avoids impact, on display and brightness improvement of the display panel, caused by chaotic transmission of the data signal.

[0097] In another embodiment, when n>1 and the display panel is in the trigger state, the method further includes: successively outputting, by the scanning driving circuit **6** in response to the first scanning frame start signal, the scanning signal to the 1^{st} pixel row **5** to the M^{th} pixel row **5**; and after a k^{th} time of high frequency scanning ends, determining whether the scanning driving circuit **6** is performing scanning and is in a scanning process where the scanning driving circuit **6** outputs the scanning signal to an $(x+1)^{th}$ pixel row **5** to the M^{th} pixel row **5**, and if it is determined that the scanning driving circuit **6** is performing scanning and is in the scanning process, directly performing a $(k+1)^{th}$ time of high frequency scanning, or if it is determined that the scanning driving circuit **6** is not performing scanning or is not in the scanning process, waiting for the scanning driving circuit **6** to output the scanning signal to the M^{th} pixel row **5** and performing a $(k+1)^{th}$ time of high frequency scanning, where k=1, . . . , and n−1.

[0098] In this driving manner, after the k^{th} time of high frequency scanning ends, in a scanning process in which the scanning driving circuit **6** outputs the scanning signal to the $(x+1)^{th}$ pixel row **5** to the M^{th} pixel row **5**, the $(k+1)^{th}$ time of high frequency scanning can be directly performed, so that a time interval between the k^{th} time of high frequency scanning and the $(k+1)^{th}$ time of high frequency scanning is shortened. Therefore, a time length required by improvement of brightness of the first subpixels **4** is shortened, and a recognition response time is reduced.

[0099] In an embodiment, when the display panel is in the first mode, for example, a standby mode or a static image display mode, to effectively reduce power consumption, the first frequency f**1** can satisfy $f1 \leq 60$ Hz, and for example, the first frequency f**1** can be 60 Hz, 30 Hz, 15 Hz, 1 Hz, or the like. When the display panel is in the second mode, for example, a dynamic image display mode, to improve a display effect, the second frequency f**2** can satisfy $60\text{ Hz} < f2 \leq f_{max}$, and for example, the second frequency f**2** can be 90 Hz, 120 Hz, or the like, where f_{max} is a maximum scanning frequency of the display panel, and for example, f_{max}=120 Hz.

[0100] When the display panel is in the trigger state, a frequency at which the first subpixels **4** are scanned is f**3**,

and it can be set that f**3**=f_{max}, so that after entering the trigger state, the first subpixels **4** are scanned at a maximum scanning frequency that can be achieved by the display panel, which improves a refresh rate of the fingerprint recognition region **2**, thereby improving the brightness of the fingerprint recognition region **2** more quickly.

[0101] In an embodiment, the method further includes: after the display panel enters the trigger state, controlling the display panel to enter a fingerprint recognition state, where a start moment of the fingerprint recognition state is later than a start moment of the trigger state. Therefore, enough brightness improvement time for the fingerprint recognition region **2** is reserved, and when fingerprint recognition is performed, light rays, with enough brightness, incident to a finger in the fingerprint recognition region **2** are ensured, so that a fingerprint image acquired by a fingerprint recognition module is clearer, and recognition precision is higher.

[0102] In an embodiment, the method further includes: after the trigger state ends, controlling the display panel to enter the fingerprint recognition state, thereby ensuring that the fingerprint recognition region **2** has enough brightness during fingerprint recognition.

[0103] Referring to FIG. **2** again, all subpixels **3** in the fingerprint recognition region **2** can be used as a light source for fingerprint recognition, that is, all the subpixels **3** in the fingerprint recognition region **2** are first subpixels **4**. FIG. **22** is another schematic diagram of a display panel according to an embodiment of the present disclosure. In another embodiment, as shown in FIG. **22**, only some of the subpixels **3** in the fingerprint recognition region **2** are used as a light source for fingerprint recognition. Because the finger has relatively high absorption and reflectivity of green light, and the fingerprint recognition module also has a relatively high identification capability of the green light, in this embodiment of the present disclosure, green subpixels in the fingerprint recognition region **2** may be used as a fingerprint recognition light source. In addition, in the fingerprint recognition state, the green subpixels may be controlled to display highest brightness, for example, display brightness corresponding to 255 grayscale, to ensure that the fingerprint recognition region **2** emits a sufficient quantity of light rays towards the finger.

[0104] In an embodiment, when the display panel is in the fingerprint recognition state, a frequency at which the subpixels **3** are scanned can be equal to the first frequency. In this case, a refresh frequency of the subpixels **3** is relatively low, which can reduce power consumption. In an embodiment, a frequency at which the subpixels **3** are scanned can be equal to the second frequency. In this case, a refresh frequency of the first subpixels **4** is relatively high, and brightness of the fingerprint recognition region **2** is higher, so that there are more light rays incident to the finger. In an embodiment, to implement both low power consumption and high brightness, when the display panel is in the fingerprint recognition state, a frequency at which the subpixels **3** are scanned can be greater than the first frequency and smaller than the second frequency.

[0105] In an embodiment, a data voltage received by the first subpixel **4** in the trigger state is smaller than a data voltage received by the first subpixel **4** in the fingerprint recognition state.

[0106] With reference to the analysis of a working principle of the pixel circuit shown in FIG. **11**, in the light-emitting period t**3**, it can be learned, according to a current formula, that a current I flowing to the organic light-emitting diode D is inversely proportional to the data voltage V_{Data}. A higher data voltage V_{Data} indicates a smaller current I flowing to the organic light-emitting diode D, and light-emitting brightness of the subpixel **3** is lower. A smaller data voltage V_{Data} indicates a higher current I flowing to the organic light-emitting diode D, and light-emitting brightness of the subpixel **3** is higher.

[0107] In the fingerprint recognition state, it is assumed that light-emitting brightness of the first subpixels **4** is L**1**, and a data voltage corresponding to the light-emitting brightness L**1** is V_{Data}**1**. In the foregoing driving manner, in the trigger state, a data voltage V_{Data}**2** smaller than the data voltage V_{Data}**1** is provided for the first subpixels **4**, so that the first subpixels **4** can be driven to emit light at the light-emitting brightness L**2** higher than L**1**, which can enable brightness of the first subpixels **4** to be more quickly improved to brightness required by fingerprint recognition.

[0108] In an embodiment, in a process of the trigger state, a data voltage received by each first subpixel **4** remains unchanged, so that the first subpixel **4** always maintains relatively high light-emitting brightness, and the brightness of the fingerprint recognition region **2** is improved at a higher rate.

[0109] In an embodiment, one time of scanning process in which the scanning driving circuit **6** successively outputs, in response to the second scanning frame start signal, the scanning signal to at least the x^{th} pixel row **5** to the y^{th} pixel row **5** is one time of high frequency scanning. When the display panel is in the trigger state, n times of high frequency scanning are performed on the first subpixels **4**, where n is a positive integer greater than or equal to 1. A data voltage received by the first subpixel **4** in the k^{th} time of high frequency scanning is greater than a data voltage received by the first subpixel **4** in the $(k+1)^{th}$ time of high frequency scanning, where k=1, 2, . . . , and n−1, to enable light-emitting brightness of the first subpixel **4** in the $(k+1)^{th}$ time of high frequency scanning to be greater than light-emitting brightness of the first subpixel **4** in the k^{th} time of high frequency scanning, which realizes gradual brightness improvement of the first subpixels **4**, achieving both a relatively high brightness improvement rate and relatively low power consumption.

[0110] In the trigger state, based on an image to be displayed by the fingerprint recognition region **2**, data voltages received by different first subpixels **4** can be the same or be different from each other. For example, when receiving the fingerprint recognition requirement, the fingerprint recognition region **2** can display an identifier of one fingerprint, used to provide, for a user, a prompt indicating that recognition is to be performed on the fingerprint. In this case, light-emitting brightness of different first subpixels **4** are different. Therefore, received data voltages are also different.

[0111] Based on a same inventive concept, an embodiment of the present disclosure further provides a display apparatus. FIG. **23** is a schematic diagram of a display apparatus according to an embodiment of the present disclosure. As shown in FIG. **23**, the display apparatus includes a display panel **100**. The display panel **100** has a display region **1** including a fingerprint recognition region **2**, and includes a plurality of subpixels **3** located in the display region **1**. The subpixels include a plurality of first subpixels **4** located in

the fingerprint recognition region **2** and used as a light source for fingerprint recognition.

[0112] The display apparatus further includes a driving chip **200**. The driving chip **200** includes a first driving module **20**, a second driving module **21**, and a third driving module **22**. The first driving module **20** is configured to control the display panel **100** to be in a first mode, to enable the display panel **100** to scan the subpixel **3** at a first frequency, or control the display panel **100** to be in a second mode, to enable the display panel **100** to scan the subpixel **3** at a second frequency, where the second frequency is greater than the first frequency. The second driving module **21** is electrically connected to the first driving module **20**, and is configured to: when the display panel **100** is in the first mode, monitor whether the display panel **100** receives a fingerprint recognition requirement, and, if yes, transmit a trigger instruction. The third driving module **22** is electrically connected to the second driving module **21**, and is configured to: when receiving the trigger instruction, control the display panel **100** to be in a trigger state, to enable the display panel **100** to scan at least the first subpixels **4**, where a frequency at which the first subpixels **4** are scanned is greater than the first frequency.

[0113] With the foregoing driving structure, when the display panel is in the first mode in which scanning is performed at a relatively low frequency, if the display panel receives the fingerprint recognition requirement, the display panel scans the first subpixels **4** in the fingerprint recognition region **2** at a frequency greater than the first frequency, so that a refresh frequency of the first subpixels **4** in the fingerprint recognition region **2** can be increased, and after being charged, the first subpixels **4** can be charged for a second time within a display time of a next frame of image with only a relatively short pause time, thereby quickly improving brightness of the first subpixels **4**.

[0114] In this embodiment of the present disclosure, after the display panel receives the fingerprint recognition requirement, a process of quickly improving the brightness of the first subpixels **4** is added, which not only shortens a fingerprint recognition response time and enhances user experience, but also quickly improves overall brightness of the fingerprint recognition region **2**. In subsequent fingerprint recognition, more light is incident to a finger from the fingerprint recognition region **2**, and a fingerprint image acquired by a fingerprint recognition module is clearer, so that recognition precision of the fingerprint is higher.

[0115] In an embodiment, referring to FIG. **23** again, the display panel **100** further includes M pixel rows **5** (for clear description, in FIG. **23**, a reference sign of an a^{th} pixel row **5** is represented by **5**_*a*, where a value of a is 1, . . . , and M) and a scanning driving circuit **6**. Each pixel row **5** includes a plurality of subpixels **3** arranged along a row direction, the first subpixels **4** are located in an x^{th} pixel row **5** to a y^{th} pixel row **5**, where $1 \le x < y \le M$, and M is a positive integer greater than 1; and the scanning driving circuit **6** is electrically connected to a first scanning frame start signal line STV**11**, a second scanning frame start signal line STV**12**, and the M pixel rows **5**.

[0116] The first driving module **20** is further configured to: when the display panel **100** is in the first mode, control the first scanning frame start signal line STV**11** to output a first scanning frame start signal, to enable the scanning driving circuit **6** to successively output a scanning signal to the 1^{st} pixel row **5** to an M^{th} pixel row **5**. The third driving module **22** is further configured to: under control of the trigger instruction, control the second scanning frame start signal line STV**12** to output a second scanning frame start signal, to enable the scanning driving circuit **6** to successively output the scanning signal to at least the x^{th} pixel row **5** to the y^{th} pixel row **5**, to improve a refresh frequency of the first subpixels **4** in the x^{th} pixel row **5** to the y^{th} pixel row **5**, to enable brightness of the first subpixels **4** to be quickly improved to a brightness threshold required by fingerprint recognition.

[0117] Referring to FIG. **5** again, the scanning driving circuit **6** can includes N**1** cascaded first scanning shift units **7**. The N**1** first scanning shift units **7** are electrically connected to the M pixel rows **5**, and an i^{th} first scanning shift unit **7** is electrically connected to the x^{th} pixel row **5**, where N**1** is a positive integer greater than 1, and $1 \le i < N1$. The first scanning frame start signal line STV**11** is electrically connected to the 1^{st} first scanning shift unit **7**, and the second scanning frame start signal line STV**12** is electrically connected to the i^{th} first scanning shift unit **7**.

[0118] A relationship between N**1** and M has been described in the foregoing embodiments, which will not be repeated herein.

[0119] In the foregoing setting manner, in one aspect, a circuit structure of the scanning driving circuit **6** does not need to be changed, and only one second scanning frame start signal line STV**12** connected to the i^{th} first scanning shift unit **7** needs to be additionally provided, so that in the trigger state, the i^{th} first scanning shift unit **7** to the $(N1)^{th}$ first scanning shift unit **7** independently scan the x^{th} pixel row **5** to the M^{th} pixel row **5**. This driving manner simplifies a structure design of the scanning driving circuit **6**, and further avoids a case in which the scanning driving circuit **6** occupies a relatively large bezel width in the display panel **100**. This is more conducive to implementation of a narrow bezel design of the display panel **100**. In another aspect, in the trigger state, in the foregoing driving manner, only the x^{th} pixel row **5** to the M^{th} pixel row **5** are scanned at a relatively high frequency. Compared with a case in which an entire screen is switched to high frequency scanning, this reduces power consumption, and further shortens a brightness improvement time of the fingerprint recognition region **2**.

[0120] In an embodiment, referring to FIG. **8** again, the scanning driving circuit **6** includes a first scanning driving circuit **8** and a second scanning driving circuit **9**. The first scanning driving circuit **8** includes N**1** cascaded second scanning shift units **10**. The N**1** second scanning shift units **10** are electrically connected to the M pixel rows **5**, and N**1** is a positive integer greater than 1. The second scanning driving circuit **9** includes N**2** cascaded third scanning shift units **11**. The N**2** third scanning shift units **11** are electrically connected to the x^{th} pixel row **5** to the y^{th} pixel row **5**, and N**2** is a positive integer greater than 1.

[0121] The first scanning frame start signal line STV**11** is electrically connected to the 1^{st} second scanning shift unit **10** in the first scanning driving circuit **8**, and the second scanning frame start signal line STV**12** is electrically connected to the 1^{st} third scanning shift unit **11** in the second scanning driving circuit **9**.

[0122] A relationship between N**1**, N**2**, and M has been described in the foregoing embodiments, which will not be repeated herein.

[0123] With the foregoing configuration, the second scanning driving circuit **9** can independently scan the x^{th} pixel row **5** to the y^{th} pixel row **5**, and a scanning manner is more flexible. Particularly, when y<M, in the trigger state, the display panel needs to perform high frequency scanning only on the x^{th} pixel row **5** to the y^{th} pixel row **5**, and does not need to scan the y^{th} pixel row **5** to the M^{th} pixel row **5**, which reduces power consumption and shortens a brightness improvement time of the fingerprint recognition region **2**.

[0124] In the foregoing setting manner, in the trigger state, because high frequency scanning needs to be performed only on pixel rows **5** in which the first subpixels **4** are located, and the last pixel row does not need to be scanned, a limitation on a setting position of the fingerprint recognition region **2** is relatively small, and the fingerprint recognition region **2** is not limited to be set on a bottom portion of the display region **1**. Even if the fingerprint recognition region **2** is set on a top portion or in the middle of the display region **1**, a brightness improvement time is not affected. This improves flexibility of the setting position of the fingerprint recognition region **2**.

[0125] In an embodiment, referring to FIG. **8** again, the first scanning driving circuit **8** and the second scanning driving circuit **9** can be located at two opposite sides of the display region **1**, respectively, to improve symmetry of bezel widths of the display panel **100**.

[0126] In an embodiment, referring to FIG. **10** again, the second scanning frame start signal line STV**12** is connected to the first suppression module **19** in series. In a process in which the scanning driving circuit **6** successively outputs, in response to the first scanning frame start signal, the scanning signal to the 1^{st} pixel row **5** to the M^{th} pixel row **5**, the first suppression module **19** is configured to suppress signal transmission on the second scanning frame start signal line STV**12**, to avoid a case in which the scanning driving circuit **6** is driven by the second scanning frame start signal in this process, thereby improving reliability of a working state of the display panel **100**.

[0127] In an embodiment, the first suppression module **19** can include at least one diode. In the process in which the scanning driving circuit **6** successively outputs, in response to the first scanning frame start signal, the scanning signal to the 1^{st} pixel row **5** to the M^{th} pixel row **5**, the diode is in a high resistance state, to suppress the signal transmission on the second scanning frame start signal line STV**12**. However, in the process in which the scanning driving circuit **6** successively outputs, in response to the second scanning frame start signal, the scanning signal to at least the x^{th} pixel row **5** to the y^{th} pixel row **5**, the diode is in a conductive state, to ensure that the scanning driving circuit **6** performs high frequency scanning on the first subpixels **4** under driven of the second scanning frame start signal.

[0128] FIG. **24** is another schematic diagram of a display apparatus according to an embodiment of the present disclosure. In an embodiment, as shown in FIG. **24**, the display panel **100** further includes an emission driving circuit **12**, and the emission driving circuit **12** is electrically connected to a first emission frame start signal line STV**21**, a second emission frame start signal line STV**22**, and the M pixel rows **5**.

[0129] The first driving module **20** is further configured to: when the display panel **100** is in the first mode, control the first emission frame start signal line STV**21** to output a first emission frame start signal, to enable the emission driving circuit **12** to successively output an emission signal to the 1^{st} pixel row **5** to the M^{th} pixel row **5**. The third driving module **22** is further configured to: under control of the trigger instruction, control the second emission frame start signal line STV**22** to output a second emission frame start signal, to enable the emission driving circuit **12** to successively output the emission signal to at least the x^{th} pixel row **5** to the y^{th} pixel row **5**, thereby implementing normal light-emitting of the subpixel **3**.

[0130] In an embodiment, referring to FIG. **13** again, the emission driving circuit **12** includes N**1'** cascaded first emission shift units **13**. The N**1'** first emission shift units **13** are electrically connected to the M pixel rows **5**, and an i'^{th} first emission shift unit **13** is electrically connected to the x^{th} pixel row **5**, where N**1'** is a positive integer greater than 1, and $1 \leq i' < N1'$. The first emission frame start signal line STV**21** is electrically connected to the 1^{st} first emission shift unit **13**, and the second emission frame start signal line STV**22** is electrically connected to the i^{th} first emission shift unit **13**.

[0131] A relationship of N**1'** and M has been described in the foregoing embodiments, which will not be repeated herein.

[0132] With such configuration, a circuit structure of the emission driving circuit **12** does not need to be changed, and only one second emission frame start signal line STV**22** connected to the i^{th} first emission shift unit **13** needs to be additionally provided, so that in the trigger state, the i^{th} first emission shift unit **13** to the $(N1)^{th}$ first emission shift unit **13** independently driving the x^{th} pixel row **5** to the M^{th} pixel row **5**. This driving manner simplifies a structure design of the emission driving circuit **12**, and further avoids a case in which the emission driving circuit **12** occupies a relatively large bezel width in the display panel **100**. This is more conducive to implementation of a narrow bezel design of the display panel **100**.

[0133] In an embodiment, referring to FIG. **17** again, the emission driving circuit **12** includes a first emission driving circuit **14** and a second emission driving circuit **15**. The first scanning driving circuit **14** includes N**1'** cascaded second emission shift units **16**. The N**1'** second emission shift units **16** are electrically connected to the M pixel rows **5**, and N**1'** is a positive integer greater than 1. The second emission driving circuit **15** includes N**2'** cascaded third emission shift units **17**. The N**2'** third emission shift units **17** are electrically connected to the x^{th} pixel row **5** to the y^{th} pixel row **5**, and N**2'** is a positive integer greater than 1.

[0134] The first emission frame start signal line STV**21** is electrically connected to the 1^{st} second emission shift unit **16** in the first emission driving circuit **14**, and the second emission frame start signal line STV**22** is electrically connected to the 1^{st} third emission shift unit **17** in the second emission driving circuit **15**.

[0135] A relationship of N**1'** and N**2'** has been described in the foregoing embodiments, which will not be repeated herein.

[0136] With such structure, when y<M, in the trigger state, the second emission driving circuit **15** needs to independently drive only pixel rows **5** in which the first subpixels **4** are located, and does not need to drive the last pixel row. The driving manner is more flexible, and reduces power consumption.

[0137] In an embodiment, referring to FIG. **19** again, the second emission frame start signal line STV**22** is connected

to the second suppression module **18** in series. In a process in which the emission driving circuit **12** successively outputs, in response to the first emission frame start signal, the emission signal to the 1^{st} pixel row **5** to the M^{th} pixel row **5**, the second suppression module **18** is configured to suppress signal transmission on the second emission frame start signal line STV**22**, to avoid a case in which the emission driving circuit **12** is driven by the second emission frame start signal in this process, thereby improving reliability of a working state of the display panel **100**.

[0138] In an embodiment, the second suppression module **18** may include at least one diode. In the process in which the emission driving circuit **12** successively outputs, in response to the first emission frame start signal, the emission signal to the 1^{st} pixel row **5** to the M^{th} pixel row **5**, the diode is in a high resistance state, to suppress the signal transmission on the second emission frame start signal line STV**22**. However, in the process in which the emission driving circuit **12** successively outputs, in response to the second emission frame start signal, the emission signal to at least the x^{th} pixel row **5** to the y^{th} pixel row **5**, the diode is in a conductive state, to ensure that the emission driving circuit **12** is driven by the second scanning frame start signal to driving the first subpixels **4**.

[0139] FIG. **25** is still another schematic diagram of a display apparatus according to an embodiment of the present disclosure. In an embodiment, as shown in FIG. **25**, the third driving module **22** includes a first determining unit **23** and a first control unit **24**. The first determining unit **23** is electrically connected to the second driving module **21**, and is configured to: when receiving the trigger instruction, determine whether the scanning driving circuit **6** is in the scanning process during which the scanning driving circuit **6** outputs the scanning signal to the 1^{st} pixel row **5** to the M^{th} pixel row **5**, and if it is determined that the scanning driving circuit **6** is in the scanning process, transmit a first instruction, or if it is determined that the scanning driving circuit **6** is not in the scanning process, transmit a second instruction. The first control unit **24** is electrically connected to the first determining unit **23**, and is configured to: when receiving the first instruction, control, only after the scanning driving circuit **6** outputs the scanning signal to the M^{th} pixel row **5** after waiting, the display panel **100** to enter the trigger state, or when receiving the second instruction, directly control the display panel **100** to enter the trigger state.

[0140] When it is monitored that the display panel receives the fingerprint recognition requirement, in this embodiment of the present disclosure, a scanning status of the scanning driving circuit **6** is determined. The scanning driving circuit **6** enters the trigger state after outputting the scanning signal to the M^{th} pixel row **5**, so that a scanning process in the first mode and a scanning process in the trigger state are mutually staggered, and in the trigger state, a data line transmits a data signal to only one pixel row **5** of the x^{th} pixel row to the M^{th} pixel row or the x^{th} pixel row to the y^{th} pixel row at a same moment, to improve transmission accuracy of the data signal, thereby avoiding impact, on display and brightness improvement of the display panel, caused by chaotic transmission of the data signal.

[0141] FIG. **26** is yet another schematic diagram of a display apparatus according to an embodiment of the present disclosure. In another embodiment, as shown in FIG. **26**, the third driving module **22** includes a second determining unit **25** and a second control unit **26**. The second determining unit **25** is electrically connected to the second driving module **21**, and is configured to: when receiving the trigger instruction, determine whether the scanning driving circuit **6** is performing scanning and in the scanning process during which the scanning driving circuit **6** outputs the scanning signal to the $(x+1)^{th}$ pixel row **5** to the M^{th} pixel row **5**, and if it is determined that the scanning driving circuit **6** is performing scanning and in the scanning process, transmit a third instruction, or if it is determined that the scanning driving circuit **6** is not performing scanning and is not in the scanning process, transmit a fourth instruction. The second control unit **26** is electrically connected to the second determining unit **25**, and is configured to: when receiving the third instruction, directly control the display panel **100** to enter the trigger state, or when receiving the second instruction, control, only after the scanning driving circuit **6** outputs the scanning signal to the M^{th} pixel row **5** after waiting, the display panel **100** to enter the trigger state.

[0142] With such driving manner, after receiving the fingerprint recognition requirement, the scanning driving circuit **6** can directly enter the trigger state in the scanning process of outputting the scanning signal to the $(x+1)^{th}$ pixel row **5** to the M^{th} pixel row **5**, to shorten a time interval between receiving the fingerprint recognition requirement and entering the trigger state, thereby shortening a recognition response time to some extent.

[0143] With such driving manner, scanning in the trigger state is directly performed when scanning in the first mode does not end. Although a case in which the data line simultaneously transmits the data signal to two pixel rows **5** occurs, because the first subpixels **4** in the trigger state are refreshed at a very high rate, the data signal on the data line is also refreshed very quickly, and the data signal transmitted on the data line does not remain at a fixed electric potential for an excessively long time. Therefore, image display and brightness improvement are not severely affected. Compared with that scanning in the trigger state is performed when the scanning driving circuit **6** outputs the scanning signal to the 1't pixel row **5** to the x^{th} pixel row **5**, in the foregoing driving manner, scanning in the trigger state is performed only after scanning performed by the scanning driving circuit **6** on the x^{th} pixel row **5** ends. A quantity of remaining pixel rows **5** that are not scanned in the scanning process in the first mode is relatively small. Therefore, in the trigger state, there are relatively few cases in which the data line simultaneously transmits the data signal to two pixel rows **5**, so that impact of the data signal on image display and brightness improvement is smaller.

[0144] FIG. **27** is yet another schematic diagram of a display apparatus according to an embodiment of the present disclosure. In an embodiment, as shown in FIG. **27**, the driving chip **200** further includes a storage module **27** configured to pre-store a quantity n of times of high frequency scanning, where one time of scanning process in which the scanning driving circuit **6** successively outputs, in response to the second scanning frame start signal, the scanning signal to at least the x^{th} pixel row **5** to the y^{th} pixel row **5** is one time of high frequency scanning, where n is a positive integer greater than or equal to 1. The third driving module **22** is further electrically connected to the storage module **27**, and is further configured to: under control of the trigger instruction, perform n times of high frequency scanning on the first subpixels **4**.

[0145] The quantity n of times of high frequency scanning is preset, so that after entering the trigger state, the display panel directly performs n times of high frequency scanning on the first subpixels **4**. In this case, the fingerprint recognition region **2** can achieve a required brightness threshold. There is no need to monitor in real-time, in the trigger state, brightness of the fingerprint recognition region **2**, and a driving manner is simpler and more convenient.

[0146] FIG. **28** is yet another schematic diagram of a display apparatus according to an embodiment of the present disclosure. In an embodiment, as shown in FIG. **28**, the driving chip **200** further includes a fourth driving module **28**. The fourth driving module **28** is electrically connected to the third driving module **22**, and is configured to: after the third driving module **22** controls the display panel **100** to be in the trigger state, control the display panel to enter a fingerprint recognition state, where a start moment of the fingerprint recognition state is later than a start moment of the trigger state, and earlier than an end moment of the trigger state. Therefore, enough brightness improvement time for the first subpixels **4** is reserved, and when fingerprint recognition is performed, light rays, with enough brightness, incident to a finger in the fingerprint recognition region **2** are ensured, so that a fingerprint image acquired by a fingerprint recognition module is clearer, and recognition precision is higher.

[0147] The above descriptions are merely some embodiments of the present disclosure, and are not intended to limit the present disclosure. Any modifications, equivalent replacements, improvements, and the like made within the spirit and principle of the present disclosure shall fall within the protection scope of the present disclosure.

[0148] Finally, it should be noted that the foregoing embodiments are merely intended for describing the technical solutions of the present disclosure, but not for limiting the present disclosure. Although the present disclosure is described in detail with reference to the foregoing embodiments, persons of ordinary skill in the art should understand that they may still make modifications to the technical solutions described in the foregoing embodiments or make equivalent replacements to some or all technical features thereof, without departing from the scope of the technical solutions of the embodiments of the present disclosure.

What is claimed is:

1. A method for driving a display panel, wherein the display panel has a display region comprising a fingerprint recognition region and comprises subpixels located in the display region, and the subpixels comprise first subpixels located in the fingerprint recognition region and are used as a light source for fingerprint recognition;

wherein the display panel has working modes comprising a first mode and a second mode, wherein the subpixels are scanned at a first frequency in the first mode, and the subpixels are scanned at a second frequency in the second mode, wherein the second frequency is greater than the first frequency; and

wherein the method comprises:

when the display panel is in the first mode, monitoring whether the display panel receives a fingerprint recognition requirement, and if it is monitored that the display panel receives the fingerprint recognition requirement, controlling the display panel to enter a trigger state; and

when the display panel is in the trigger state, scanning the first subpixels at a frequency greater than the first frequency.

2. The method according to claim **1**, wherein the display panel further comprises:

M pixel rows, wherein each of the M pixel rows comprises at least two of the subpixels arranged along a row direction, and the first subpixels are located in an x^{th} pixel row of the M pixel rows to a y^{th} pixel row of the M pixel rows, wherein $1 \le x < y \le M$, and M is a positive integer greater than 1; and

a scanning driving circuit electrically connected to a first scanning frame start signal line, a second scanning frame start signal line, and the M pixel rows;

wherein when the display panel is in the first mode, the scanning driving circuit successively outputs, in response to a first scanning frame start signal provided by the first scanning frame start signal line, a scanning signal to a 1^{st} pixel row of the M pixel rows to an M^{th} pixel row of the M pixel rows, and when the display panel is in the trigger state, the scanning driving circuit successively outputs, in response to a second scanning frame start signal provided by the second scanning frame start signal line, the scanning signal to at least the x^{th} pixel row to the y^{th} pixel row.

3. The method according to claim **2**, wherein the scanning driving circuit comprises N**1** first scanning shift units that are cascaded, wherein the N**1** first scanning shift units are electrically connected to the M pixel rows, and an i^{th} first scanning shift unit of the N**1** first scanning shift units is electrically connected to the x^{th} pixel row, wherein N**1** is a positive integer greater than 1, and $1 \le i < N1$;

the first scanning frame start signal line is electrically connected to a 1^{st} first scanning shift unit of the N**1** first scanning shift units, and the second scanning frame start signal line is electrically connected to the i^{th} first scanning shift unit;

said the scanning driving circuit successively outputting the scanning signal to the 1^{st} pixel row to the M^{th} pixel row comprises: providing, by the first scanning frame start signal line, an effective level, and providing, by the second scanning frame start signal line, a non-effective level in such a manner that the N**1** first scanning shift units are controlled to successively output the scanning signal to the 1^{st} pixel row to the M^{th} pixel row; and

said the scanning driving circuit successively outputting the scanning signal to at least the x^{th} pixel row to the y^{th} pixel row comprises: providing, by the second scanning frame start signal line, an effective level in such a manner that the i^{th} first scanning shift unit to an $(N1)^{th}$ first scanning shift unit of the N**1** first scanning shift units are controlled to successively output the scanning signal to the x^{th} pixel row to the M^{th} pixel row.

4. The method according to claim **2**, wherein the second scanning frame start signal line is connected to a first suppression module in series; and

in a process in which the scanning driving circuit successively outputs, in response to the first scanning frame start signal, the scanning signal to the 1^{st} pixel row to the M^{th} pixel row, the first suppression module is configured to suppress signal transmission on the second scanning frame start signal line.

5. The method according to claim 2, wherein the display panel further comprises an emission driving circuit, and the emission driving circuit is electrically connected to a first emission frame start signal line, a second emission frame start signal line, and the M pixel rows;

when the display panel is in the first mode, the method further comprises: successively outputting, by the emission driving circuit in response to a first emission frame start signal, an emission signal to the 1^{st} pixel row to the M^{th} pixel row, and

when the display panel enters the trigger state, the method further comprises: successively outputting, by the emission driving circuit in response to a second emission frame start signal, the emission signal to at least the x^{th} pixel row to the y^{th} pixel row;

wherein when the display panel is in the first mode, a frequency at which the emission driving circuit outputs the emission signal is greater than the first frequency; and

when the display panel enters the trigger state, the frequency at which the emission driving circuit outputs the emission signal is equal to the frequency at which the first subpixels are scanned.

6. The method according to claim 2, wherein if it is monitored that the display panel receives the fingerprint recognition requirement, the method further comprises:

determining whether the scanning driving circuit is in a scanning process where the scanning driving circuit is outputting the scanning signal to the 1^{st} pixel row to the M^{th} pixel row; and

if it is determined that the scanning driving circuit is in the scanning process, waiting for the scanning driving circuit to output the scanning signal to the M^{th} pixel row and then controlling the display panel to enter the trigger state; or if it is determined that the scanning driving circuit is not in the scanning process, directly controlling the display panel to enter the trigger state.

7. The method according to claim 2, wherein if it is monitored that the display panel receives the fingerprint recognition requirement, the method further comprises:

determining whether the scanning driving circuit is performing scanning and is in a scanning process where the scanning driving circuit outputs the scanning signal to an $(x+1)^{th}$ pixel row of the M pixel rows to the M^{th} pixel row; and

if it is determined that the scanning driving circuit is performing scanning and is in the scanning process, directly controlling the display panel to enter the trigger state; or if it is determined that the scanning driving circuit is not performing scanning or is not in the scanning process, waiting for the scanning driving circuit to output the scanning signal to the M^{th} pixel row and then controlling the display panel to enter the trigger state.

8. The method according to claim 2, further comprising:

pre-storing a number n of times of high frequency scanning, wherein n is a positive integer greater than or equal to 1, wherein one time of scanning process during which the scanning driving circuit successively outputs, in response to the second scanning frame start signal, the scanning signal to the x^{th} pixel row to the y^{th} pixel row is one time of high frequency scanning; and

when the display panel is in the trigger state, performing n times of high frequency scanning on the first subpixels.

9. The method according to claim 8, wherein, when n>1, in processes of the n times of high frequency scanning, the first subpixels are scanned at a same frequency.

10. The method according to claim 8, wherein, when n>1, in processes of at least two times of high frequency scanning, the first subpixels are scanned at different frequencies.

11. The method according to claim 8, wherein, when n>1 and the display panel is in the trigger state, the method further comprises:

successively outputting, by the scanning driving circuit in response to the first scanning frame start signal, the scanning signal to the 1^{st} pixel row to the M^{th} pixel row; and

after a k^{th} time of high frequency scanning of the n times of high frequency scanning ends, determining whether the scanning driving circuit is in a scanning process where the scanning driving circuit outputs the scanning signal to the 1^{st} pixel row to the M^{th} pixel row, and, if it is determined that the scanning driving circuit is in the scanning process, waiting for the scanning driving circuit to output the scanning signal to the M^{th} pixel row and then performing a $(k+1)^{th}$ time of high frequency scanning of the n times of high frequency scanning, or if it is determined that the scanning driving circuit is not in the scanning process, directly performing the $(k+1)^{th}$ time of high frequency scanning, wherein k=1, . . . , and (n−1).

12. The method according to claim 8, wherein when n>1 and the display panel is in the trigger state, the method further comprises:

successively outputting, by the scanning driving circuit in response to the first scanning frame start signal, the scanning signal to the 1^{st} pixel row to the M^{th} pixel row; and

after a k^{th} time of high frequency scanning of the n times of high frequency scanning ends, determining whether the scanning driving circuit is performing scanning and is in a scanning process where the scanning driving circuit outputs the scanning signal to an $(x+1)^{th}$ pixel row of the M pixel rows to the M^{th} pixel row, and if it is determined that the scanning driving circuit is performing scanning and is in the scanning process, directly performing a $(k+1)^{th}$ time of high frequency scanning of the n times of high frequency scanning, or if it is determined that the scanning driving circuit is not performing scanning and is not in the scanning process, waiting for the scanning driving circuit to output the scanning signal to the M^{th} pixel row and then performing the $(k+1)^{th}$ time of high frequency scanning, wherein k=1, . . . , and (n−1).

13. The method according to claim 1, wherein the first frequency is f1, $f1 \leq 60$ Hz, the second frequency is f2, 60 Hz$<f2 \leq f_{max}$, and f_{max} is a maximum scanning frequency of the display panel; and

when the display panel is in the trigger state, the frequency at which the first subpixels are scanned is f3, where $f3=f_{max}$.

14. The method according to claim 1, further comprising:

after the display panel enters the trigger state, controlling the display panel to enter a fingerprint recognition state,

wherein a start moment of the fingerprint recognition state is later than a start moment of the trigger state.

15. The method according to claim **14**, wherein after the trigger state ends, the display panel is controlled to enter the fingerprint recognition state.

16. The method according to claim **14**, wherein, when the display panel is in the fingerprint recognition state, a frequency at which the subpixels are scanned is equal to the first frequency or the second frequency, or the frequency at which the subpixels are scanned is greater than the first frequency and smaller than the second frequency.

17. The method according to claim **14**, wherein a data voltage received by at least one of the first subpixels in the trigger state is smaller than a data voltage received by the at least one of the first subpixels in the fingerprint recognition state.

18. The method according to claim **17**, wherein in a process of the trigger state, a data voltage received by each of the first subpixels remains constant.

19. The method according to claim **17**, wherein one time of scanning process during which the scanning driving circuit successively outputs, in response to a second scanning frame start signal, the scanning signal to at least the x^{th} pixel row to the y^{th} pixel row is one time of high frequency scanning; and

when the display panel is in the trigger state, n times of high frequency scanning is performed on the first subpixels, wherein n is a positive integer greater than or equal to 1, and a data voltage received by the first subpixels during a k^{th} time of high frequency scanning of the n times of high frequency scanning is greater than a data voltage received by the at least one of the first subpixels during a $(k+1)^{th}$ time of high frequency scanning of the n times of high frequency scanning, wherein k=1, 2, . . . , and (n−1).

20. A display apparatus, comprising:

a display panel, wherein the display panel has a display region comprising a fingerprint recognition region and comprises subpixels located in the display region, and the subpixels comprise first subpixels located in the fingerprint recognition region and are used as a light source for fingerprint recognition; and

a driving chip,

wherein the driving chip comprises:

a first driving module, wherein the first driving module is configured to control the display panel to be in a first mode such that the display panel scans the subpixels at a first frequency, or is configured to control the display panel to be in a second mode such that the display panel scans the subpixels at a second frequency, wherein the second frequency is greater than the first frequency;

a second driving module electrically connected to the first driving module, wherein the second driving module is configured to monitor, when the display panel is in the first mode, whether the display panel receives a fingerprint recognition requirement, and if it is determined that the display panel receives the fingerprint recognition requirement, the second driving module is configured to transmit a trigger instruction; and

a third driving module electrically connected to the second driving module, wherein the third driving module is configured to: after receiving the trigger instruction, control the display panel to be in a trigger state in such a manner that the display panel scans the first subpixels at a frequency greater than the first frequency.

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