



(12) Utility Model Patent



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(73) Patent Holder: CHEN Yunhua

Address: Room 601 Irene Building, Baima Garden, Yuancun Peak, Tianhe District,
Guangzhou, Guangdong Province 510627

(72) Inventor(s): LI Ruiliang

(74) Patent Firm or Agency: Guangzhou Jiaquan IP Law 44205

Agent: TAN Yingqiang

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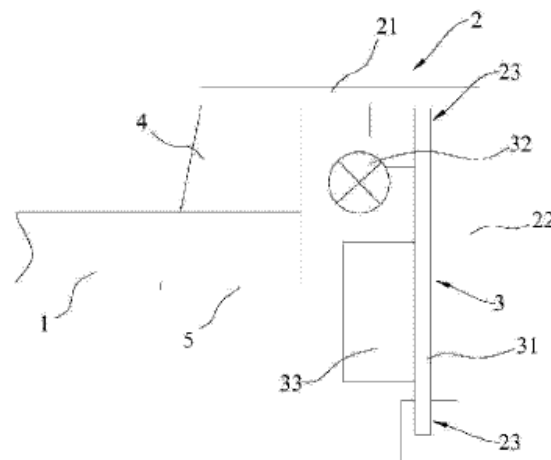
(54) Title of Utility Model

New type of infrared touch screen

(57) Abstract of Disclosures

The present utility model discloses a new type of infrared touch screen. It includes a screen body, a rectangular frame in which the screen body is embedded, and an infrared touch assembly located in the rectangular frame and arranged around the screen body. The rectangular frame includes a front wall parallel to the screen body and a side wall perpendicular to the screen body. The front wall reaches to the front of an edge of the screen body and is connected to the screen body through a filter strip. The infrared touch assembly includes a PCB board which is

arranged in the rectangular frame and parallel to the side wall, and a plurality of infrared tubes which are arranged on the PCB board, located outside the filter strip and closely attached to a plane of the front surface of the screen. The infrared tubes include infrared emitting tubes respectively located on a left frame and a lower frame of the rectangular frame, and infrared receiving tubes respectively located on the right frame and the upper frame thereof. Through the above design, the present utility model makes the electronic components on the PCB board located behind the front surface of the screen, so as to overcome the existing problems that the infrared touch screen frame is too wide, the front wall of the frame and the outer surface of the touch screen are too far away from each other. It not only improves the appearance of a product, but also reduces the occurrence of false touches.



CN 203720812 U

1. A new type of infrared touch screen, characterized in that the infrared touch screen comprises: a screen body, a rectangular frame in which the screen body is embedded, and an infrared touch assembly which is located in the rectangular frame and arranged around the screen body, the rectangular frame comprises a front wall parallel to the screen body and a side wall perpendicular to the screen body, the front wall reaches to the front of an edge of the screen body and is connected to the screen body via a filter strip, the infrared touch assembly comprises a PCB board which is arranged in the rectangular frame and parallel to the side wall, and a plurality of infrared tubes which are arranged on the PCB board, located outside the filter strip and closely attached to a plane of a front surface of the screen body, the infrared tubes comprise infrared emitting tubes respectively located on a left frame and a lower frame of the rectangular frame, and infrared receiving tubes respectively located on a right frame and an upper frame thereof.

2. The new type of infrared touch screen according to claim 1, characterized in that a light shielding layer is provided along peripheral edges surrounding a rear surface of the screen body.

3. The new type of infrared touch screen according to claim 1 or 2, characterized in that the filter strip comprises a condensing filter strip arranged on an inner side of the infrared emitting tubes and a non-condensing filter strip arranged on an inner side of the infrared receiving tubes.

4. The new type of infrared touch screen according to claim 1 or 2, characterized in that the rectangular frame forms a clamping slot for inserting the PCB board on an inner side of the side wall.

5. The new type of infrared touch screen according to claim 1 or 2, characterized in that a front surface and a rear surface of the filter strip are respectively adhesively connected to the front wall of the rectangular frame and the front surface of the screen body.

6. The new type of infrared touch screen according to claim 5, characterized in that an inner side of the front wall of the rectangular frame forms a convex rib in which the filter strip is embedded.

7. The new type of infrared touch screen according to claim 1 or 2, characterized in that the rectangular frame further comprises a bottom frame that clamps the peripheral edges of the rear surface of the screen body, and the bottom frame and the side wall form an inner cavity that encapsulates the infrared touch assembly in the rectangular frame.

8. The new type of infrared touch screen according to claim 7, characterized in that the bottom frame is fixedly connected to the side wall, or the bottom frame and the side wall are formed into one unit through an integral molding process.

9. The new type of infrared touch screen according to claim 7, characterized in that the rectangular frame is an aluminum alloy member or a plastic member.

New type of infrared touch screen

Technical Field

[0001] The present utility model relates to a touch screen, in particular to a new type of infrared touch screen.

Background Art

[0002] The current touch screens mainly include surface acoustic wave touch screens, infrared touch screens, resistive touch screens, capacitive touch screens, and other types of touch screens. The surface acoustic wave touch screens have the characteristics of high resolution, short response time, being unsuitable for multi-touch, good stability, good explosion resistance, good light transmission, and being difficult to have large sizes. The infrared touch screens have the characteristics of good resolution, fast response time, being easy to achieve multi-touch, good stability, good explosion resistance, good light transmission, and being easy to have large sizes. The resistive touch screens have the characteristics of high resolution, short response time, being unsuitable for multi-touch, good stability, poor light transmission, poor explosion resistance, and being difficult to have large sizes. The capacitive touch screens have the characteristics of high resolution, short response time, being suitable for multi-touch, normal stability, normal light transmittance, good explosion resistance, easy drift, and being difficult to have large sizes. In summary, the infrared touch screens have the advantages of good resolution, fast response time, being easy to achieve multi-touch, good stability, good explosion resistance, good light transmission, and being easy to have large sizes. In addition, the current market requires good user experience and good touch feel. Thus, the infrared touch screens become one of the most popular touch screen types among those mainstream touch screens in large sizes.

[0003] The existing infrared touch screen is generally composed of a frame, a filter strip, glass, a PCB board, electronic components welded on the PCB board, an infrared emitting tube(s), an infrared receiving tube(s), and so on. In general, the PCB board, the center line of the infrared light emitted by the infrared emitting tube(s) welded on the PCB board and the center line of the infrared light received by the infrared receiving tube(s) are all parallel to the touch surface of the touch screen. In addition, all electronic components of the touch screen are encapsulated in a package composed of a frame body and the filter strip. Thus, there are

shortcomings that the touch screen frame is too wide and the distance between the surface of the touch screen frame and the glass surface added to the display is too long, which affect the appearance of a product. Moreover, the infrared light emitted by the infrared emitting tube(s) is too high. Thus, it is easy to cause false touches.

Summary of the Utility Model

[0004] In order to solve the above problems, the present utility model provides a new type of infrared touch screen that overcomes the problems of excessively wide frame of the existing infrared touch screen and the excessive long distance between the upper surface of the frame and the outer surface of the touch screen, improves the appearance of a product, and reduces the occurrence of false touches.

[0005] The present utility model employs the following technical solutions to solve those technical problems: a new type of infrared touch screen comprises: a screen body, a rectangular frame in which the screen body is embedded, and an infrared touch assembly which is located in the rectangular frame and arranged around the screen body, the rectangular frame comprises a front wall parallel to the screen body and a side wall perpendicular to the screen body, the front wall reaches to the front of an edge of the screen body and is connected to the screen body via a filter strip, the infrared touch assembly comprises a PCB board which is arranged in the rectangular frame and parallel to the side wall, and a plurality of infrared tubes which are arranged on the PCB board, located outside the filter strip and closely attached to a plane of a front surface of the screen body, the infrared tubes comprise infrared emitting tubes respectively located on a left frame and a lower frame of the rectangular frame, and infrared receiving tubes respectively located on a right frame and an upper frame thereof.

[0006] As a further improvement of the technical solution of the present utility model, a light shielding layer is provided along peripheral edges surrounding a rear surface of the screen body.

[0007] As a further improvement of the technical solution of the present utility model, the filter strip comprises a condensing filter strip arranged on an inner side of the infrared emitting tubes and a non-condensing filter strip arranged on an inner side of the infrared receiving tubes.

[0008] As a further improvement of the technical solution of the present utility model, the rectangular frame forms a clamping slot for inserting the PCB board on an inner side of the side wall.

[0009] As a further improvement of the technical solution of the present utility model, a front surface and a rear surface of the filter strip are respectively adhesively connected to the front wall of the rectangular frame and the front surface of the screen body.

[0010] As a further improvement of the technical solution of the present utility model, an inner side of the front wall of the rectangular frame forms a convex rib in which the filter strip is embedded.

[0011] As a further improvement of the technical solution of the present utility model, the rectangular frame further comprises a bottom frame that clamps the peripheral edges of the rear surface of the screen body, and the bottom frame and the side wall form an inner cavity that encapsulates the infrared touch assembly in the rectangular frame.

[0012] As a further improvement of the technical solution of the present utility model, the bottom frame is fixedly connected to the side wall, or the bottom frame and the side wall are formed into one unit through an integral molding process.

[0013] As a further improvement of the technical solution of the present utility model, the rectangular frame is an aluminum alloy member or a plastic member.

[0014] The present utility model has the following beneficial effects: in the infrared touch screen provided by the present utility model, the PCB board located in the rectangular frame is arranged parallel to the side wall, so that the electronic components on the PCB board can be located behind the front surface of the screen body. Thus, the infrared tubes are arranged close to the plane of the front surface of the screen body, and the limitation on the distance between the front wall of the rectangular frame and the front surface of the screen body caused by the electronic components on the PCB board can be avoided. Through the above-mentioned design, the utility model overcomes the problems of excessively wide frame and excessive distance between the upper surface of the frame and the outer surface of the touch screen in the existing infrared touch screens. The present utility model improves the appearance of a product, the floating touch becomes lower, the touch accuracy and reliability are higher, and the occurrence of false touches can be effectively reduced.

Brief Description of Drawings

[0015] The present utility model will be further described below with reference to the accompanying drawings:

[0016] Fig. 1 is a schematic diagram of the structure of a first embodiment of the present utility model.

[0017] Fig. 2 is a schematic diagram of the structure of a second embodiment of the present utility model.

[0018] Fig. 3 is a schematic diagram of the structure of a third embodiment of the present utility model.

Description of the Embodiments

[0019] Referring to Fig. 1 to 3, the present utility model provides a new type of infrared touch screen, which includes a screen body 1, a rectangular frame 2 in which the screen body 1 is embedded, and an infrared touch assembly 3, which is located in the rectangular frame 2 and arranged around the screen body 1. The screen body 1 is a part of the infrared touch screen, and is generally composed of glass; it includes a front surface and a rear surface. The rectangular frame 2 includes a front wall 21 parallel to the screen body 1 and a side wall 22 perpendicular to the screen body 1. The front wall 21 reaches to the front of the edge of the screen body 1 and is connected to the screen body 1 via a filter strip 4. The infrared touch assembly 3 includes a PCB board 31 which is arranged in the rectangular frame 2 and parallel to the side wall 22, and a plurality of infrared tubes 32, which are arranged on the PCB board 31, outside the filter strip 4, and closely attached to the plane of the front surface of the screen body 1. The infrared tubes 32 include infrared emitting tubes respectively located on a left frame and a lower frame of the rectangular frame 2, and infrared receiving tubes respectively located on a right frame and an upper frame thereof.

[0020] In the infrared touch screen provided by the present utility model, the PCB board 31 located in the rectangular frame 2 is arranged parallel to the side wall 22, so that the electronic components 33 on the PCB board 31 can be located behind the front surface of the screen body 1. Thus, the infrared tubes 32 are arranged close to the plane of the front surface of the screen body 1, and the limitation on the distance between the front wall of the rectangular frame 2 and the front surface of the screen body 1 caused by the electronic components 33 on the

PCB board 31 can be avoided. Through the above-mentioned design, the utility model overcomes the problems of excessively wide frame and excessive distance between the upper surface of the frame and the outer surface of the touch screen in the existing infrared touch screens. The present utility model improves the appearance of a product, the floating touch becomes lower, the touch accuracy and reliability are higher, and the occurrence of false touches can be effectively reduced.

[0021] As a preferred embodiment of the present utility model, a light shielding layer 5 is provided around the peripheral edges of the rear surface of the screen body 1. The light shielding layer 5 can be a black film printed or pasted to make the product more attractive and durable.

[0022] As a preferred embodiment of the present utility model, the filter strip 4 includes a condensing filter strip arranged on an inner side of the infrared emitting tubes and a non-condensing filter strip arranged on an inner side of the infrared receiving tubes. On the one hand, this allows the infrared receiving tubes to receive stronger signals through the light condensing structure, so that the touch is more reliable and the touch effect is better; on the other hand, this achieves the effect of one infrared emitting tube emitting and multiple infrared receiving tubes receiving, so as to realize multi-point touch.

[0023] As a preferred embodiment of the present utility model, the rectangular frame 2 forms a clamping slot 23 on an inner side of the side wall 22 for mounting the PCB board 31. In this way, when the infrared touch assembly 3 is installed in the rectangular frame 2, the infrared touch assembly 3 forms an integral structure on the PCB board 31, and cooperates with the clamping slot 23 on the inner side of the side wall 22 to facilitate rapid installation and debugging.

[0024] As a preferred embodiment of the present utility model, the front and rear surfaces of the filter strip 4 are adhesively connected to the front wall 21 of the rectangular frame 2 and the front surface of the screen body 1, respectively.

[0025] As a preferred embodiment of the present utility model, an inner side of the front wall 21 of the rectangular frame 2 forms a convex rib 24 in which the filter strip 4 is embedded.

[0026] As a preferred embodiment of the present utility model, the rectangular frame 2 further includes a bottom frame 25 that clamps the peripheral edges of the rear surface of the screen body 1, and the bottom frame 25 and the side wall 22 are fixedly connected or integrated by an integral molding process. The bottom frame 25 and the side walls 22 form an inner cavity

that encapsulates the infrared touch assembly 3 in the rectangular frame 2. This not only ensures that the screen body 1 is fixedly installed in the rectangular frame 2, not also protects the internal infrared touch assembly 3 from damages.

[0027] As a preferred embodiment of the present utility model, the rectangular frame 2 is an aluminum alloy member or a plastic member, so that the touch screen has a lighter weight and a lower cost.

[0028] Certainly, the present utility model is not limited to the above-mentioned embodiments. A person skilled in the art can make equivalent modifications or substitutions without departing from the scope of the present utility model. These equivalent modifications or substitutions are all within the scope defined by the claims of this application.

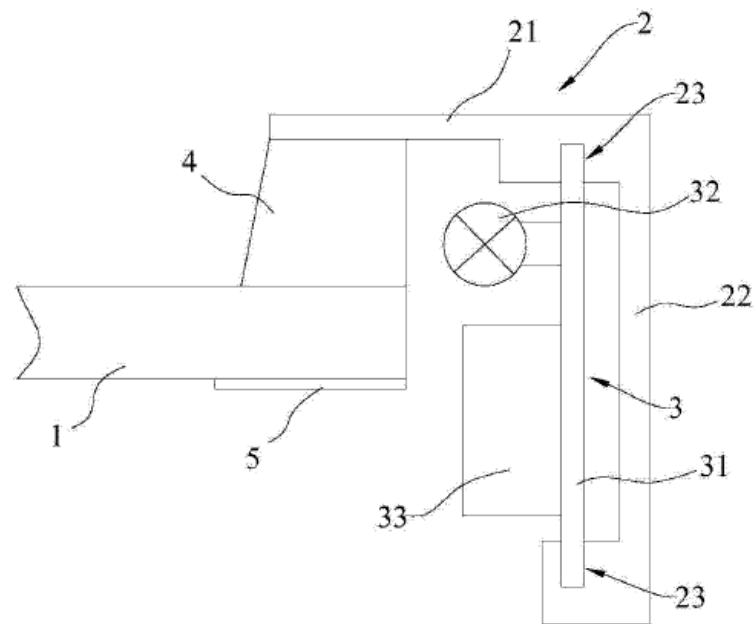


Fig. 1

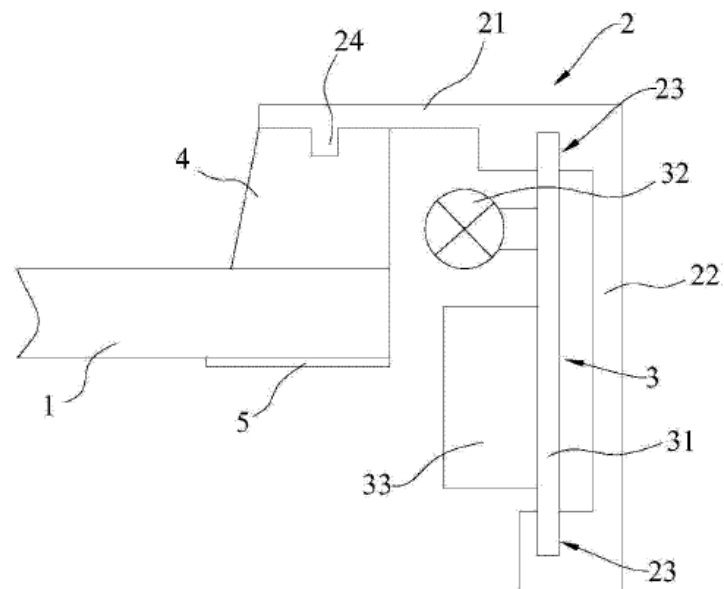


Fig. 2

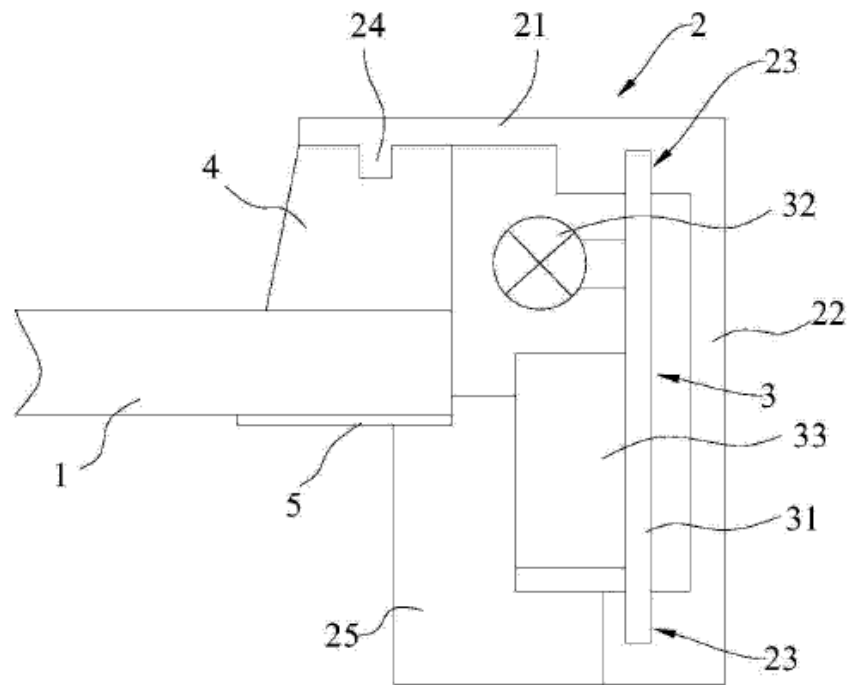
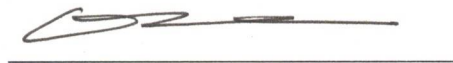


Fig. 3

AFFIDAVIT OF QIANG LI

I, Qiang Li, hereby declare that I am competent in both Chinese and English and that the attached translation is, to the best of my knowledge and belief, a true and accurate translation from Chinese to English of CN 203720812U.

I declare under penalty of perjury that all statements made herein of my own knowledge are true, and all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like are punishable by fine or imprisonment, or both, under and may jeopardize the validity of the application or any patent issuing thereon.



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