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(54) **PALLET FOR PACKAGING LIQUID CRYSTAL DISPLAY COMPONENT AND METHOD FOR PACKAGING LIQUID CRYSTAL DISPLAY COMPONENT**

(52) **U.S. Cl.**
USPC **53/467; 206/701**

(57) **ABSTRACT**

The present invention discloses a pallet for packaging LCD components and a method for packaging LCD components. The pallet comprises a panel bearing area and two accessory bearing areas which are respectively arranged on both sides of the panel bearing area. In the present invention, because both sides of the panel bearing area of the pallet are respectively provided with an accessory bearing area for arranging the accessories of LCD components (namely PCB, flexible connector and the like), the LCD components are mutually staggered in the pallet; shattered fragments caused by collision between the LCD panels and the pallet is avoided, and the connectors of the PCBs or other electronic components are prevented from being crushed because a single side (one side of the accessory bearing area) bears high load. Meanwhile, the stacked thickness is not greatly affected by the PCBs, and then the total stacked height of the LCD components is reduced. Thus, more LCD components can be stacked in the pallet.

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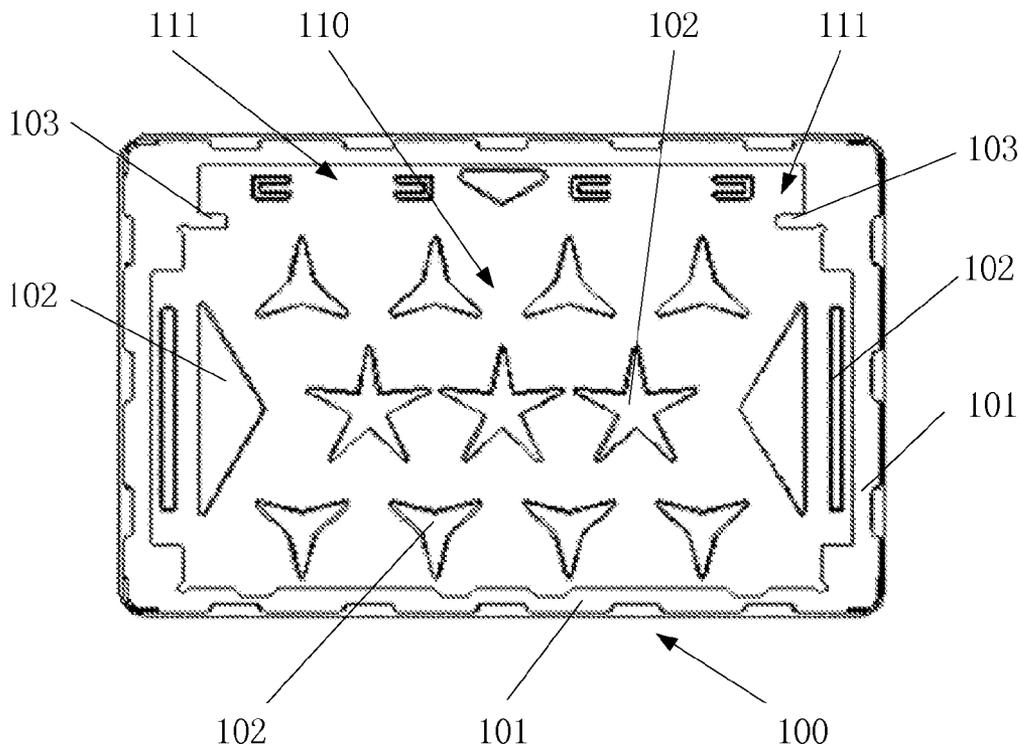
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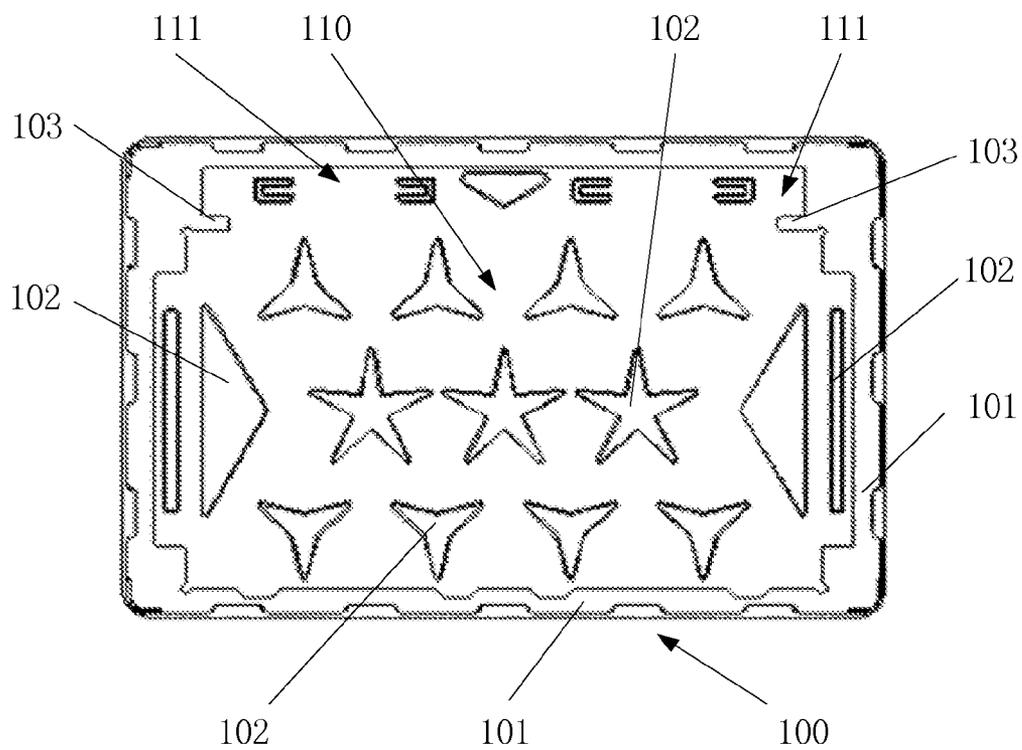


Figure 1

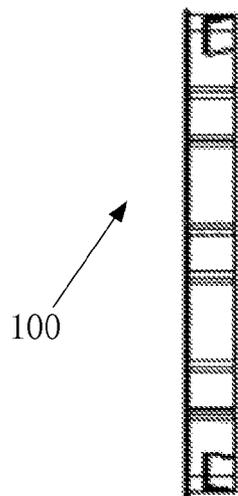


Figure 2

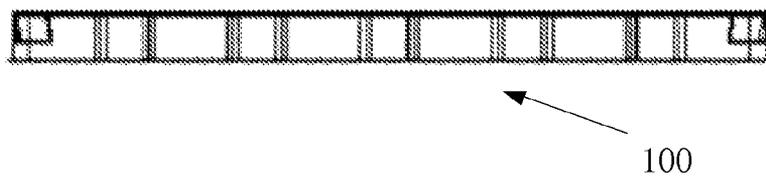


Figure 3

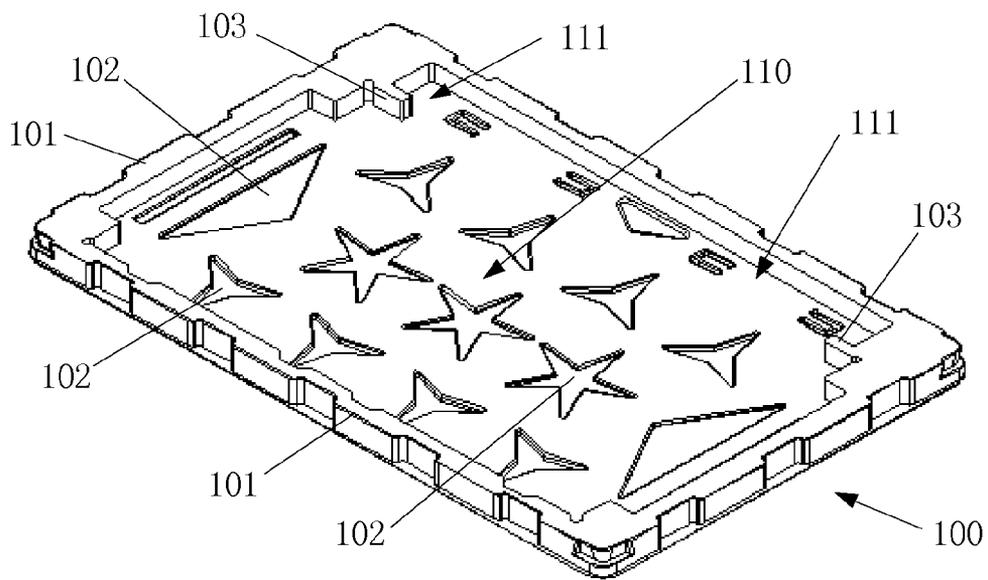


Figure 4

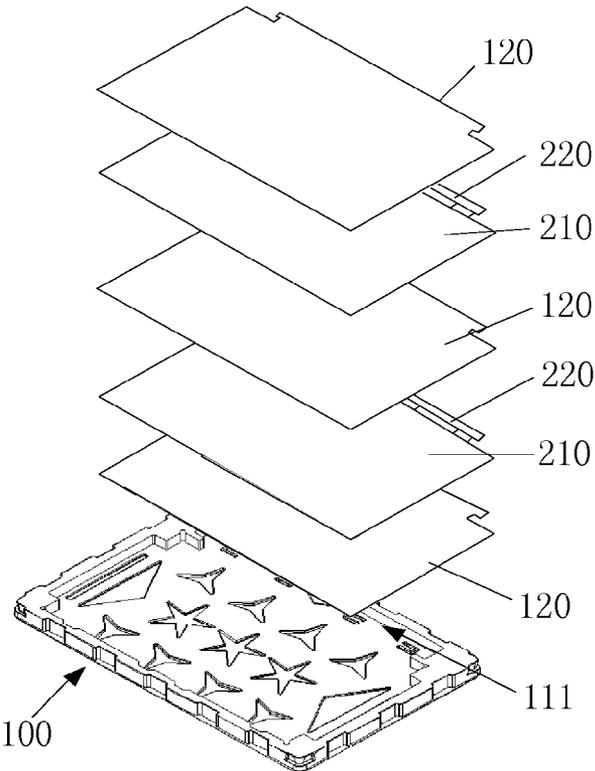


Figure 5

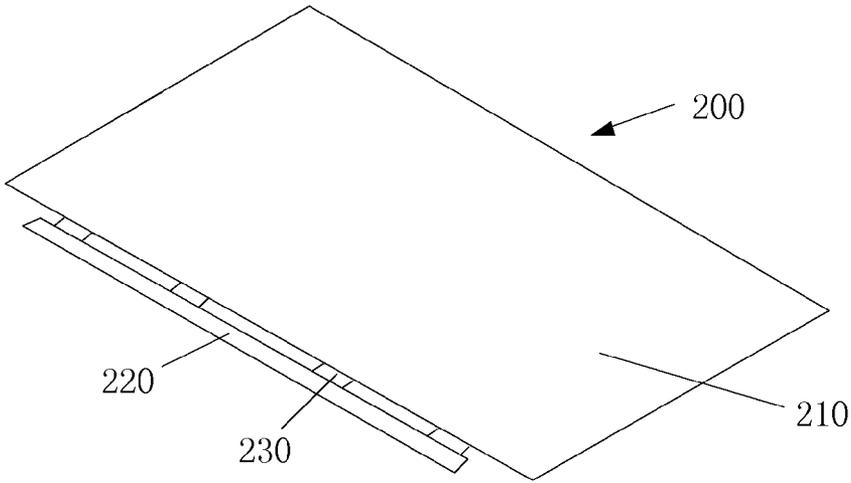


Figure 6

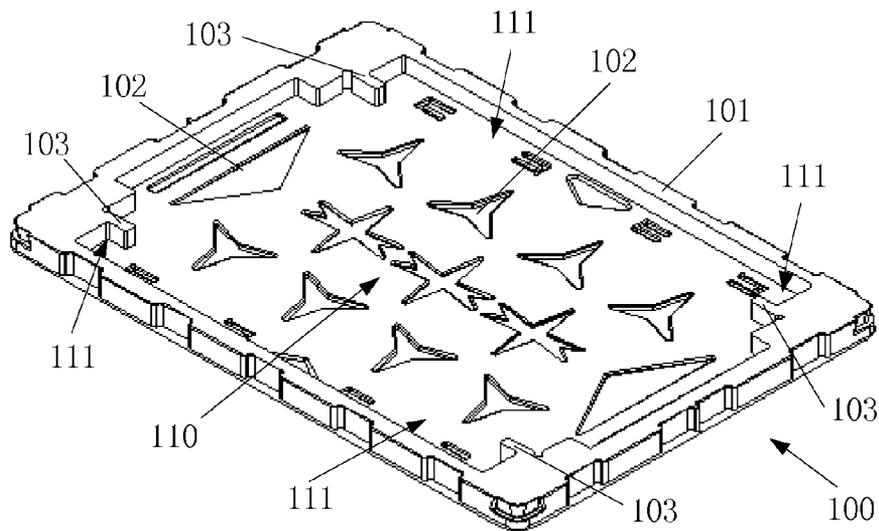


Figure 7

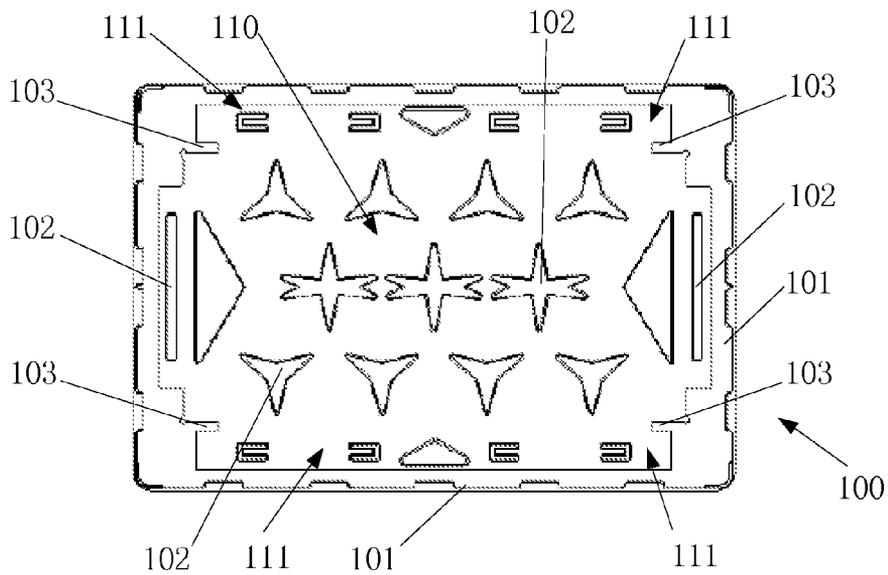


Figure 8

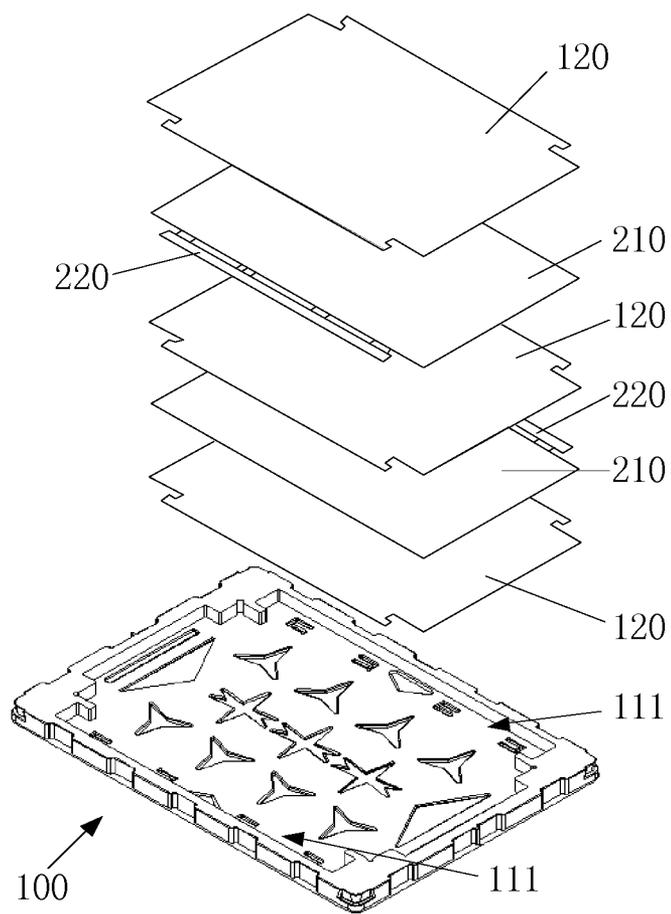


Figure 9

**PALLET FOR PACKAGING LIQUID
CRYSTAL DISPLAY COMPONENT AND
METHOD FOR PACKAGING LIQUID
CRYSTAL DISPLAY COMPONENT**

TECHNICAL FIELD

[0001] The present invention relates to the field of liquid crystal displays (LCDs), and more particularly to a pallet for packaging LCD components and a method for packaging LCD components.

BACKGROUND

[0002] Electronic products have the characteristics of complicated structure, high value, and rapid update speed, etc. There are complicated supply chains among manufacturers. In terms of the production and marketing forms of the present electronic products, most products are respectively produced, assembled and distributed in different places, so that the parts, the semi-finished products and the like of electronic products must be transported among manufacturers. Take the field of LCDs as an example, the production of raw materials and panels of LCD products, the assembly of panel components, the assembly of LCD modules, liquid crystal television, etc. may be respectively performed in different countries or regions, or performed by different manufacturers in the same region, or performed in different factories, resulting in the problems of packaging and transporting LCD panels, panel components or LCD modules.

[0003] At present, frequently-used LCD components are packaged by pallets. FIGS. 1 to 5 respectively show a view of a structure of an existing pallet and a schematic diagram of a pallet for packaging LCD components. As shown in FIG. 1 to FIG. 4, a pallet **100** is of a frame structure. A panel bearing area **110** and accessory bearing area(s) **111** arranged on one side of the panel bearing area are arranged in the pallet frame, i.e. the packaging space; and the panel bearing area **110** and the accessory bearing area(s) **111** are surrounded and formed by side walls **101**. An LCD component in the figure comprises an LCD panel and an accessory, wherein the accessory comprises flexible connector and printed circuit board (PCB). Usually, the thickness of a LCD panel is not equal to that of a PCB, and the maximum thickness of the PCB is even about 2 times as much as the thickness of a LCD panel. For example: the thickness of a LCD panel is 1.9 mm, and the maximum thickness of a PCB is 3.6 mm. Thus, when the LCD components are sequentially stacked in the pallet, the total height of the stacked LCD panels **210** on one side of the panel bearing area **110** near the edge is much higher than the total height of the PCBs **220** on one side of the accessory bearing area **111**, and extrusion occurs between PCB and PCB so that some electronic components are easily crushed. FIG. 5 shows a schematic diagram of an existing plastic pallet for packaging LCD components. The figure only shows two LCD components arranged in each plastic pallet. In fact, more LCD components can be arranged in each plastic pallet in accordance with the structure of the plastic pallet **100** and the structural strength of each LCD component **200**. The existing pallet and its arranging method are shown in FIG. 5. The LCD components are not arranged in a staggered mode, and the PCBs **220** are arranged on the same side. Thus, the height of the accessory bearing area **111** after arrangement is: $3.6+3.6=7.2$ mm. On one side on which each LCD panel **210** is arranged, the LCD panel **210** inclines because of thin thickness, and the

LCD panel **210** has large free space in the LCD panel bearing area **110**. Thus, LCD panel **210** is easy to be shattered due to its collision with the pallet **100**. Meanwhile, because of the much higher height of the accessory bearing area **111**, the PCBs of each accessory bearing area **111** bear most loads, and this may easily cause the connectors of the PCBs or other relatively higher electronic components to be damaged.

SUMMARY

[0004] The aim of the present invention is to provide a reliable pallet for packaging liquid crystal display components and a method of packaging liquid crystal display components.

[0005] The purpose of the present invention is achieved by the following technical schemes. A pallet for packaging LCD components, wherein the pallet comprises a panel bearing area and two accessory bearing areas which are respectively arranged on both sides of the panel bearing area.

[0006] Preferably, the accessory bearing areas are arranged on the two opposite sides of the panel bearing area. In general, an LCD panel is rectangular in shape. The accessory bearing areas are arranged on the two opposite sides of the panel bearing area so that the panel bearing area is suitable for arranging panels.

[0007] Preferably, retaining walls are respectively arranged between the panel bearing area and the accessory bearing areas on the two sides of the panel bearing area. The retaining walls prevent the LCD components from sliding, thus preventing the shattering of the LCD components caused by violent collision between the LCD components and the pallet.

[0008] Preferably, the pallet also comprises multiple buffer gaskets which are stacked in the pallet and are used for buffering and separating the LCD components. The buffer gaskets can prevent damages caused by collision between the LCD components and the pallet, and by collision between LCD components.

[0009] Preferably, the structure and shape of the surface of each gasket is consistent with the spatial shape of the panel bearing area in the pallet and the accessory bearing areas on both sides of the bearing area. Thus, the buffer gaskets can protect the LCD components to the maximum extent so that each part of the LCD components can be protected by the buffer gaskets.

[0010] Preferably, the thickness of each buffer gasket is from 1.5 to 2.5 mm. Only the buffer gasket with a certain thickness can play a buffer role, and excess thickness affects the loading capacity of the pallet.

[0011] Preferably, the bottom of the pallet is also provided with reinforced structures. The strength of the pallet is enhanced by the reinforced structures so that the pallet cannot be damaged and then the LCD components cannot be damaged.

[0012] Preferably, the pallet is made of plastic material. The manufacturing cost of the pallet is reduced because of the low cost of the plastic material.

[0013] A method for packaging LCD component, comprising the following steps:

[0014] A. Putting a first LCD component in the pallet so that one LCD panel of the LCD component is corresponding to the panel bearing area in the pallet, and the PCB and flexible connector of the LCD component are corresponding to the accessory bearing area on one side of the pallet;

[0015] B. Putting a second LCD component in the pallet so that the LCD panel of the LCD component is corresponding

to the panel bearing area in the pallet and the PCB and flexible connector of the LCD component are corresponding to the accessory bearing area on the other side of the pallet;

[0016] C. Repeating the step A and step B until all the LCD components are packaged.

[0017] Wherein, in the step A, one buffer gasket is put in the pallet before the first LCD component is put in the pallet, and the other buffer gasket is put in the pallet after the first LCD component is put in the pallet.

[0018] In the present invention, because both sides of the panel bearing area of the pallet are respectively provided with an accessory bearing area for arranging the accessories of the LCD components (namely PCB, flexible connector and the like), the LCD components are staggered in the pallet, and the accessories (namely PCB, flexible connector and the like) between two adjacent LCD components are respectively positioned in the accessory bearing areas on different sides of the pallet. Thus, this prevents the the high stacked height of the accessory bearing area, because the thickness of each PCB when being arranged on the same side is more than that of each LCD panel, and the low height of the panel bearing area; inclination can be avoided, and then shattered fragments caused by collision between the LCD panel and the pallet can be avoided. In addition, adjacent LCD components arranged in a staggered mode can prevent the connectors of the PCBs or other electronic components from being crushed because a single side (one side of the accessory bearing area) bears high load. Meanwhile, because the PCBs of two adjacent LCD components are respectively positioned in the accessory bearing areas on both sides, the stacked thickness is not greatly affected by the PCBs, and then the total stacked height of the LCD components is reduced. Thus, more LCD components can be stacked in the pallet.

BRIEF DESCRIPTION OF FIGURES

[0019] FIG. 1 is a front view of a structure of an existing pallet;

[0020] FIG. 2 is a left view of a structure of an existing pallet;

[0021] FIG. 2 is a top view of a structure of an existing pallet;

[0022] FIG. 4 is a simplified structural diagram of a structure of an existing pallet;

[0023] FIG. 5 is a schematic diagram of an existing pallet for packaging LCD components;

[0024] FIG. 6 is a simplified structural diagram of LCD components;

[0025] FIG. 7 is a simplified structural diagram of one embodiment of the present invention;

[0026] FIG. 8 is a front view of one embodiment of the present invention; and

[0027] FIG. 9 is a schematic diagram of a pallet for packaging LCD component of one embodiment of the present invention.

[0028] Wherein: 100. pallet; 101. side wall; 102. reinforced structure; 103. retaining wall; 110. panel bearing area; 111. accessory bearing area; 120. buffer gasket; 200. LCD component; 210. LCD panel; 220. PCB; 230. flexible connector.

DETAILED DESCRIPTION

[0029] The present invention will further be described in detail in accordance with the figures and the preferred embodiments.

[0030] The structure of the pallet for packaging LCD components of the present invention is shown in FIG. 7 and FIG. 8. The pallet 100 is of a square groove structure. Arranged in the groove are a panel bearing area 110 mainly used for bearing LCD panels and accessory bearing areas 111 mainly used for bearing flexible connectors, PCBs and the like. Wherein, the panel bearing area 110 is positioned in the central area of the groove; the accessory bearing areas 111 are positioned on both sides of the panel bearing area 110; and the accessory bearing areas 111 are communicated with the panel bearing area 110. By arranging the accessory bearing areas 111 on both sides of the panel bearing area 110, when bearing LCD components 200, the LCD components 200 can be sequentially stacked; namely after the first LCD component 200 is arranged, accessories (including flexible connector 230, PCB 220 and the like) positioned on the LCD panel 210 are positioned in the accessory bearing area 111 of one side; when the second LCD component 200 is arranged, the second LCD panel is still positioned in the panel bearing area 110, and accessories (including flexible connector 230, PCB 220 and the like) positioned on the second LCD panel are positioned in the accessory bearing area 111 of the other side; the third LCD component 200 is also staggered from the second LCD component 200, and the rest LCD components are positioned in the same mode until all the LCD components are positioned. Because each PCB 220 is thick, the thickness of the PCB 220 is more than that of the LCD panel 210 in general. Take an LCD panel shown in FIG. 6 as an example, the thickness of the PCB 220 is 3.6 mm, and the thickness of the LCD panel 210 is only 1.9 mm. For the mutually stacked LCD components, take two LCD components 200 positioned as shown in FIG. 9 for an example. The height of the accessory bearing areas 111 on both sides should be about 3.6 mm after the two LCD components 200 are mutually staggered. Thus, all the heights of the LCD panels positioned in the central area are the same. Therefore, shattered fragments caused by collision between the panels and the pallet because of large free space produced by the LCD panels can be avoided. Meanwhile, because the flexible connectors 230 and PCBs 220 of two adjacent LCD components staggered are respectively positioned on different sides, the bearing loads of both sides are balanced; and the bearing load of a single side is reduced, so that the connectors of the PCBs 220 or other higher electronic components are prevented from being crushed. In addition, because the height of the accessory bearing areas 111 on both sides is reduced after loading the LCD components 200, the pallet can bear more LCD components 200.

[0031] In one embodiment of the present invention, retaining walls 103 are arranged between the panel bearing area 110 and the accessory bearing areas 111 on both sides of the panel bearing area. The retaining walls 103 enable the LCD components 200 not to greatly slide. Thus, shattered fragments caused by violent collision between the LCD components 200 and the pallet 100 can be avoided.

[0032] In one embodiment of the present invention, as shown in FIG. 9, the pallet 100 is also provided with buffer gaskets 120; and the buffer gaskets 120 are arranged at the bottom of the bearing area of the pallet 100, between two adjacent LCD components 200 and above the last LCD component 200. The shape of each buffer gasket 120 is consistent with the shape of the bearing area in the pallet. In general, the buffer gasket 120 is made of soft material such as foamed plastic, etc., and is mainly used for separating two adjacent

LCD components **200** and playing the actions of buffering and electrostatic prevention. The buffer gasket **120** should have certain thickness so that the buffer gasket **120** can achieve effective buffer function. Thus, damage caused by extrusion between two adjacent LCD components **200** is avoided. The thickness of the buffer gasket **120** is between 1.5 and 2.5 mm in general; and more preferably, in one embodiment of the present invention, the thickness of the buffer gasket **120** is 2 mm.

[0033] In one embodiment of the present invention, the bottom of the pallet **100** is provided with multiple reinforced structures **102** with different shapes; the shapes of the reinforced structures **102** are not limited to the shapes shown in the figure; and the reinforced structures **102** are mainly used for increasing the resistance to deformation of the pallet **100**.

[0034] In one embodiment of the present invention, the pallet is made of cheap plastic material which has the advantages of preferable plasticity and easy molding, and is molded by injection molding or vacuum molding in general.

[0035] The method for packaging liquid crystal display components of the present invention comprises the following steps:

[0036] A. Putting a buffer gasket in the pallet, and putting a first LCD component in the pallet so that a LCD panel of the LCD component is corresponding to the panel bearing area in the pallet, and the PCB and flexible connector of the LCD component are corresponding to the accessory bearing area on one side of the pallet; and putting a second buffer gasket on the LCD component;

[0037] B. Putting a second LCD component in the pallet so that the LCD panel of the LCD component is corresponding to the panel bearing area in the pallet and the PCB and flexible connector of the LCD component are corresponding to the accessory bearing area on the other side of the pallet; and

[0038] C. Repeating step A and step B until all the LCD components are packaged; and

[0039] Covering the last buffer gasket on the last LCD component so as to avoid damaging the LCD component when stacking the pallet.

[0040] The present invention is described in detail in accordance with the above contents with the specific preferred embodiments. However, this invention is not limited to the specific examples. For the ordinary technical personnel of the technical field of the present invention, on the premise of keeping the conception of the present invention, the technical personnel can also make simple deductions or replacements, and all of which should be considered to belong to the protection scope of the present invention.

We claim:

1, A pallet for packaging LCD components, comprising: a panel bearing area and two accessory bearing areas which are respectively arranged on both sides of the panel bearing area.

2, The pallet for packaging LCD components of claim **1**, wherein said accessory bearing areas are arranged on the two opposite sides of the panel bearing area.

3, The pallet for packaging LCD components of claim **1**, wherein said retaining walls are respectively arranged between the panel bearing area and the accessory bearing area on the two sides of the panel bearing area.

4, The pallet for packaging LCD components of claim **1**, wherein said pallet also comprises multiple buffer gaskets which are stacked in said pallet and are used for buffering and separating the LCD components.

5, The pallet for packaging LCD components of claim **4**, wherein the structure and shape of the surface of each said gasket is consistent with the spatial shape of the panel bearing area in the pallet and the accessory bearing areas on both sides of the bearing area.

6, The pallet for packaging LCD components of claim **5**, wherein the thickness of each said buffer gasket is from 1.5 to 2.5 mm.

7, The pallet for packaging LCD components of claim **1**, wherein the bottom of said pallet is also provided with reinforced structures.

8, The pallet for packaging LCD components of claim **1**, wherein said pallet is made of plastic material.

9, A method for packaging LCD components, comprising the following steps:

A. putting a first LCD component in a pallet so that an LCD panel of the LCD component is corresponding to a panel bearing area in the pallet and a PCB and flexible connector of the LCD component are corresponding to an accessory bearing area on one side of the pallet;

B. putting a second LCD component in the pallet so that the LCD panel of the LCD component is corresponding to the panel bearing area in the pallet and the PCB and flexible connector of the LCD component are corresponding to the accessory bearing area on the other side of the pallet; and

C. repeating the step A and step B until all the LCD components are packaged.

10, The method for packaging LCD components of claim **9**, wherein in said step A, one buffer gasket is put in said pallet before putting said first LCD component in said pallet, and the other buffer gasket is put in said pallet after putting the first LCD component.

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