

ELECTRONIC CARD MODULE INSERTION TOOL

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to an electronic card module connector,
5 and more particularly, to an electronic card module insertion tool for an
electronic card module connector.

2. Description of the Related Art

In order to meet the demand for ultra-thin, portable and lightweight
electronic apparatuses without sacrificing their functionalities, the areas of
10 the motherboards in current electronic apparatuses are often jam-packed
with a variety of powerful features. As such, some components such as
memory cards, which require space for fingers to install, may not be
provided with enough space for their installation.

FIG. 1 depicts one possible scenario of a motherboard packed with
15 features. An electronic card module connector 91 receiving a horizontally
disposed electronic card module 92 is mounted on a motherboard 93. Two
electronic components 94 and 95 are mounted side by side on the
motherboard 93 near the card receiving side of the electronic card module
connector 91. Because the two electronic components 94 and 95 are
20 disposed close to the position of the outside edge of the electronic card
module 92 during its installation, a portion of the outside edge of the
electronic card module 92 adjacent to the two electronic components 94 and
95 cannot be accessed in order to apply installation force to install the
electronic card module 92, and as a result increases the difficulty of the
25 installation of the electronic card module 92. In addition, the two electronic
components 94 and 95 are positioned closer to one corner of the electronic
card module 92 such that the installation force will be applied in an
unbalanced manner, and improper and damage-causing installation of the
electronic card module 92 is likely to occur.

Thus, an electronic card module tool for overcoming the above-mentioned issues is highly desired.

SUMMARY OF THE INVENTION

An objective of the present invention is to provide an electronic card module tool for an electronic card module connector that cannot be provided with enough space to install an electronic card module therein. The electronic card module tool can be easily applied without any set-up procedure, requires less installation force, and can also prevent an electronic card module from inappropriately rotating during installation.

In order to achieve the above objective, an electronic card module insertion tool is disclosed according to the first embodiment of the present invention. The electronic card module insertion tool is configured for an electronic card module connector, which receives a horizontally disposed electronic card module. The electronic card module has an insertion edge and an outside edge opposite the insertion edge. The electronic card module insertion tool comprises a handle component and a hook component. The hook component is pivotally mounted to the handle component and includes a hook portion configured to grasp the outside edge of the electronic card module. The handle component is configured to pivot to transmit an applied force to the hook component such that the hook portion of the hook component pushes the outside edge of the electronic card module.

The second embodiment of the present embodiment discloses an electronic card module insertion tool configured for an electronic card module connector for receiving a horizontally disposed electronic card module having an insertion edge and an outside edge opposite the insertion edge. The electronic card module connector includes an elongated insulative housing having opposite ends, a card-receiving slot between the ends, a plurality of internally-disposed terminals having contact portions protruding into the card-receiving slot, and a pair of latch/ejector levers

pivotally mounted on the insulative housing at each opposite end thereof. The electronic card module insertion tool comprises a handle component and a hook component. The hook component is pivotally mounted to the handle component and includes a hook portion configured to grasp the outside edge of the electronic card module. The handle component is configured to pivot to transmit an applied force to the hook component such that the hook portion of the hook component pushes the outside edge of the electronic card module.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be described according to the appended drawings in which:

FIG. 1 depicts one possible scenario of a motherboard packed with components;

FIG. 2 is a perspective view of an electronic card module connector and an electronic card module tool according to one embodiment of the present invention;

FIG. 3 is a perspective view of an electronic card module tool according to one embodiment of the present invention;

FIG. 4 is another perspective view of the electronic card module tool shown in FIG. 3 according to one embodiment of the present invention;

FIG. 5 is an exploded perspective view of FIG. 2;

FIG. 6 is a side view of FIG. 2;

FIG. 7 is a top view of FIG. 2;

FIG. 8 is a perspective view of an electronic card module tool at a position after an electronic card module is inserted according to one embodiment of the present invention;

FIG. 9 is a side view of FIG. 8;

FIG. 10 is a top view of FIG. 8.

DETAILED DESCRIPTION OF THE INVENTION

As illustrated in FIGS. 2, 3, and 4, the present invention proposes an
5 electronic card module insertion tool 1. The electronic card module
insertion tool 1 is adapted to an electronic card module connector 2, which
is configured to receive an electronic card module 3 disposed horizontally
or parallel to a printed circuit board 4. The electronic card module 3 can be,
for example, a memory card such as double data rate synchronous DRAM
10 (DDR SDRAM, DDR2 SDRAM, and DDR3 SDRAM). The electronic
card module insertion tool 1 has a simple structure, in which a handle
component 11 and a hook component 12 attached by a pivot point to the
handle component 11 are included.

The electronic card module insertion tool 1 is used to conveniently
15 install an electronic card module 3 into an electronic card module connector
2, and is, especially, used to install an electronic card module 3 having an
outside edge 31 which is inaccessible because other electronic components
6 and 7 are disposed too closely to the outside edge 31 of the electronic card
module 3 such that insertion force cannot be easily applied or applied in
20 equilibrium using one's fingers. The hook component 12 of the electronic
card module insertion tool 1 has a hook portion 121 at the distal end thereof,
and the hook portion 121 is used to grasp the outside edge 31 of the
electronic card module insertion tool 1 so that when the hook component 12
is pulled along the direction of electronic card module insertion by the
25 handle component 11, the hook portion 121 pushes against the outside edge
31 of the electronic card module 3 to insert the electronic card module 3
into the electronic card module connector 2.

As shown in FIGS. 3 and 5, in the embodiment of the present invention,
the hook component 12 comprises a pair of elongated elements 123, which
30 are substantially identical and are disposed parallel to each other. The two

elongated elements 123 are sufficiently spaced apart, and the respective ends of the two elongated elements 123 are bent to form a hook-like shape and are connected by a connecting element 13 such that insertion force is applied simultaneously at two different positions along the outside edge 31 of the electronic card module 3 so that the insertion of the electronic card module 3 can be smooth. Pivot pin portions 122 are formed at the other end of each of the two elongated elements 123. Each pivot pin portion 122 is received within a respective pin hole 111 formed on the handle component 11 so that the hook component 12 can move in a pivoting manner relative to the handle component 11.

Referring to FIGS. 5 and 6, the plate-like handle component 11 is configured to allow a user to apply force to insert an electronic card module 3, which is ready for insertion, and to move in a pivoting manner to transmit the applied force to the hook component 12 such that the applied force can cause the hook portion 121 to push the outside edge 31 of the electronic card module 3. According to the embodiment of the present invention, the handle component 11 can have an elongated rectangular shape, the length of which can be almost equivalent to the elongated length of the electronic card module connector 2. The handle component 11 comprises an elongated top edge portion 114 and an elongated bottom edge portion 112 opposite to the elongated top edge portion 114. Preferably, each of the bottom edge portion 112 and the top edge portion 114 in the present embodiment is rounded in the thickness direction of the handle component 11 to form an elongated round edge face. In other embodiments, the cross section, transverse to the elongation direction of the handle component 11, of each of the bottom edge portion 112 and the top edge portion 114 can be a square shape or a polygonal shape. As shown in FIG. 6, when the electronic card module insertion tool 1 is set up for electronic card module insertion, the bottom edge portion 112 rests upon the surface of the printed circuit board 4 behind the electronic card connector 2 and against the backside of the electronic card module connector 2 as a pivot point, and then a force for inserting the electronic card module 3 can be applied on the

top edge portion 114.

In the present embodiment, two rectangular through holes 113 can be formed on the handle component 11 and the two elongated elements 123 pivot within the respective through holes 113.

5 Referring to FIG. 6, the hook portion 121 of the hook component 12 has a size and shape appropriate to provide relatively non-movable engagement with the outside edge 31 of the electronic card module 3. In other words, the hook portion 121 is bent around and roughly fits the thickness of the outside edge 31 of the electronic card module 3 such that
10 after the hook portion 121 hooks the outside edge 31, the outside edge 31 will not slip off.

The elongated element 123 of the hook component 12 has a sufficient length to allow the engagement between the hook portion 121 and the outside edge 31 of the electronic card module 3 when the handle component
15 11 is placed behind the electronic card module connector 2. At least one slightly angular bend can be formed on each elongated element 123 such that the hook component 12 has a slightly deflected shape. Such a slightly deflected shape can prevent the electronic card module 3 from rotating during insertion.

20 Referring to FIG. 5, the electronic card module connector 2 comprises an elongated insulative housing 21 having opposite ends 211, a card-receiving slot 212 between the ends 211, a plurality of terminals 22 and 23 that are disposed within the insulative housing 21 and have contact portions 221 and 231 protruding into the card-receiving slot 212, a pair of
25 latch/ejector levers 24 mounted by pivot points on the insulative housing 21 at each opposite end 211 thereof, and a plurality of fixtures 25 disposed on the bottom of the two ends 211 and configured to fix the electronic card module connector 2 to the printed circuit board 4. Each latch/ejector lever 24 comprises a latch portion 241 configured to lock into the respective
30 notch 33 of an inserted electronic card module 3 and an ejector portion 242

for engaging the insertion edge 32 of an inserted electronic card module 3 at a corner thereof to eject the inserted electronic card module 3 from the card-receiving slot 212 in response to the pivoting action of the lever 24. Each end 211 includes a groove 2111 such that an electronic card module 3 can be horizontally held before it is inserted into card-receiving slot 212.

Referring to FIGS. 2, 5, and 7, when an electronic card module 3 is prepared for installation into an electronic card module connector 2, the electronic card module 3 is initially inserted into the grooves 2111 of the ends 211. Next, the hook portion 121 comes into engagement with the outside edge 31 of the electronic card module 3 and the handle component 11 is put behind the electronic card module connector 2 in erected position and with a bottom edge portion 112 resting upon the printed circuit board 4 and against the backside of the electronic card module connector 2 as shown in FIG. 2.

As shown in FIGS. 8-10, once the electronic card module insertion tool 1 is ready, a force can be applied on the top edge portion 114 facing upward to cause the handle component 11 to rotate with the bottom edge portion 112 supported by the printed circuit board 4 and the backside of the electronic card module connector 2. When the force is applied, the handle component 11 moves in a pivoting manner relative to the printed circuit board 4 and the backside of the electronic card module connector 2 so that the applied force can be transmitted to the hook component 12 to push the outside edge 31 of the electronic card module 3. The insertion process continues until the electronic card module 3 is completely inserted. Finally, after the insertion of the electronic card module 3 is completed, the hook portion 121 is unhooked from the outside edge 31.

In summary, the present invention proposes an electronic card module insertion tool, which includes a handle component and a hook component attached by a pivot to the handle component. The hook component includes a hook portion of a size and shape appropriate to provide relatively non-movable engagement with the outside edge of an electronic card module,

and when a force is applied to the handle component, the handle component transmits the applied force to the hook component so as to cause the hook portion to push the outside edge of the electronic card module.

5 The above-described embodiments of the present invention are intended to be illustrative only. Numerous alternative embodiments may be devised by persons skilled in the art without departing from the scope of the following claims.

What is claimed is:

1. An electronic card module insertion tool for an electronic card module connector mounted on a printed circuit board for receiving a horizontally disposed electronic card module, the electronic card module connector having a backside opposite the side of receiving the electronic card module, the electronic card module having an insertion edge and an outside edge opposite the insertion edge, the electronic card module insertion tool comprising:

a handle component; and

a hook component pivotally mounted to the handle component and including a hook portion configured to grasp the outside edge of the electronic card module;

wherein the handle component is configured to move in a pivoting manner to transmit an applied force to the hook component such that the hook portion of the hook component pushes the outside edge of the electronic card module.

2. The electronic card module insertion tool of Claim 1, wherein the handle component includes an edge portion that is placed against the printed circuit board and the backside of the electronic card module connector such that the handle component moves in a pivoting manner with the edge portion.

3. The electronic card module insertion tool of Claim 2, wherein the hook component has a sufficient length to allow the engagement between the hook portion and the outside edge of the electronic card module when the handle component is placed behind the electronic card module connector.

4. The electronic card module insertion tool of Claim 3, wherein the hook component comprises a pair of elongated elements each having a

hook-like shape end and a connecting element; and the elongated elements are spaced apart and connected by the connecting element at the hook-like shape ends.

5 5. The electronic card module insertion tool of Claim 4, wherein at least one slightly angular bend is formed on each elongated element.

6. The electronic card module insertion tool of Claim 1 or 5, wherein the hook portion has a size and shape sufficient to provide non-movable engagement with the outside edge of the electronic card module.

10 7. An electronic card module insertion tool for an electronic card module connector mounted on a printed circuit board for receiving a horizontally disposed electronic card module having a insertion edge and an outside edge opposite the insertion edge; the electronic card module connector including an elongated insulative housing having opposite ends, a card-receiving slot between the ends, a plurality of internally-disposed terminals having contact portions protruding into the card-receiving slot,
15 and a pair of latch/ejector levers pivotally mounted on the insulative housing at each opposite end thereof; the electronic card module connector having a backside opposite the side of the card-receiving slot, the electronic card module insertion tool comprising:

20 a handle component; and

 a hook component pivotally mounted to the handle component and including a hook portion configured to grasp the outside edge of the electronic card module;

25 wherein the handle component is configured to move in a pivoting manner to transmit an applied force to the hook component such that the hook portion of the hook component pushes the outside edge of the electronic card module.

8. The electronic card module insertion tool of Claim 7, wherein

the handle component includes an edge portion that is placed against the printed circuit board and the backside of the electronic card module connector such that the handle component moves in a pivoting manner with the edge portion.

5 9. The electronic card module insertion tool of Claim 8, wherein the hook component has a sufficient length to allow the engagement between the hook portion and the outside edge of the electronic card module when the handle component is placed behind the electronic card module connector.

10 10. The electronic card module insertion tool of Claim 9, wherein the hook component comprises a pair of elongated elements each having a hook-like shape end and a connecting element; and the elongated elements are spaced apart and are connected by the connecting element at the hook-like shape ends.

15 11. The electronic card module insertion tool of Claim 10, wherein at least one slightly angular bend is formed on each elongated element.

 12. The electronic card module insertion tool of Claim 7 or 8, wherein the hook portion has a size and shape sufficient to provide non-movable engagement with the outside edge of the electronic card module.

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