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MALE TERMINAL ROW



FIELD OF THE INVENTION

5 The present invention is related to a male terminal row, and more particularly to a male terminal row that is so configured that male terminals on the row are protected against deflection or deformation caused by external forces during different processing procedures
10 thereof, such as electroplating, packaging, and storing of finished products, to maintain the male terminal row in a precision state. Moreover, the male terminal row of the present invention may be quickly and easily assembled to a male terminal seat to effectively enhance
15 the quality of a product thereof.

BACKGROUND OF THE INVENTION

It is a trend for various kinds of electronic products
20 to have reduced dimensions and increased functions at the same time. Therefore, there must be more connecting terminals to exist in a quite limited space. The surface mounting technique (SMT) is one of many ways to allow a high density of terminals in a limited space.
25 And, a successful SMT necessitates highly precise arrangements of terminals corresponding to soldering

points on a circuit board.

It is known a connecting terminal usually includes a male terminal and a female terminal. The female
5 terminal is generally mounted on a removable part, such as, for example, a memory card. On the other hand, the male terminal is generally mounted on a fixed part, such as, for example, a terminal seat or a male seat for the memory card. One end of the male terminal is
10 outward projected to form a connecting pin for engaging with the female terminal. The other end of the male terminal forms a soldering pin for soldering to a circuit board. The soldering pin must be bent in a predetermined manner to enable soldering of the male
15 terminal to the circuit board through the SMT.

Please refer to Figs. 1 and 2 that are plan and side views, respectively, of a conventional male terminal row A. As shown, the conventional male terminal row
20 A mainly includes a plurality of parallelly arranged male terminals 1 having equal length, and a connecting band 2 integrally connected to rear ends or roots of the male terminals 1. Each of the conventional male terminals 1 has a flat and straight configuration to
25 include from a front end to a rear end a connecting pin 11, an insertion section 12, and a straight soldering

pin 13. The connecting pin 11 is for connecting to a female terminal (not shown). The insertion section 12 is fixedly inserted in a terminal seat, such as a male seat for a memory card. The straight soldering pin 13
5 is to be bent into a bent soldering pin 13a for soldering to a circuit board by means of SMT as will be further described later. Before the male terminals 1 are inserted into the terminal seat, the rear ends thereof, that is, free ends of the straight soldering pins 13,
10 are integrally connected to the connecting band 2 via respective break point 21 to enable an orderly arrangement of the male terminals 1 on the male terminal row A.

15 A male seat for memory card will now be exemplified to describe the mounting of the conventional male terminals 1 into the male seat or terminal seat, and the formation of the bent soldering pin 13a for implementing the SMT. Please refer to Figs. 3 to 6.
20 The steps of assembling the male terminal row A to a male seat 3 include: (1) inserting the male terminals 1 of the male terminal row A into predetermined insertion positions in insertion slots 31 on the terminal seat 3; (2) cutting or breaking off the connecting band 2
25 from rear end of the male terminal row A, so that the male terminals 1 become independent from one another,

as shown in Fig. 3; (3) pushing the male terminals 1 forward until they reach at respective depth as required by the memory card, as shown in Fig. 4; (4) bending the straight soldering pins 13 rearward projected from the terminal seat 3 to form bent soldering pins 13a suitable for soldering to a circuit board 4 with the SMT, as shown in Fig. 5; and (5) cutting the irregularly projected rear ends of the bent soldering pins 13a of the male terminals 1 inserted into the male seat 3 at different depths, so that the cut rear ends become flush with one another, as shown in Fig. 6, to facilitate soldering of the soldering pins to soldering points on the circuit board 4. Since there are upper and lower rows of male terminals to be mounted to the male seat 3 for the memory card, the above steps (1) to (5) are repeated for assembling the other male terminal row A after the first male terminal row A has been properly mounted to the male seat 3.

20 The following shortcomings are found in the structure and the assembling of the above described male terminals 1 of the conventional male terminal row A to the male seat 3:

25 1. The assembling of the conventional male terminal row A to the male seat 3 includes many troublesome and

time-consuming steps.

2. Particularly, after the insertion sections 12 of the male terminals 1 have been fixedly inserted in the terminal seat 3, the male terminals 1 must be trimmed and bent at rear ends of the soldering pins 13, subjecting the slender soldering pins 13 to external pressure to cause deflection and deformation thereof. Moreover, the male terminals 1 tend to have unstable quality due to accumulated errors in the course of different processing of the male terminals 1. As a result, the bent soldering pins 13a of the respective male terminals 1 could not be accurately aligned with the soldering points on the circuit board 4 to result in incomplete soldering or short circuit, as well as a high rate of defective products.

SUMMARY OF THE INVENTION

20 It is therefore a primary object of the present invention to provide an improved male terminal row to eliminate drawbacks existed in the conventional male terminal row. To achieve the above and other objects, the male terminal row according to the present invention includes a slat portion and a plurality of equally spaced male terminals integrally connected to a front edge

of the slat portion. Each of the male terminals has an insertion section formed behind a connecting pin. The insertion section is connected to the slat portion at two rear outer ends via break points. The slat
5 portion is punched at areas opposite to the male terminals to form elongated first tear-off slots. Material torn off each first tear-off slot keeps connected at a lower end to the male terminal and is backward bent to form a bent soldering pin. The slat
10 portion is further punched at predetermined positions to form a plurality of second tear-off slots. Material torn off each second tear-off slot keeps connected at an end to the slat portion and is backward bent to form a protection pin that is slightly higher than the
15 soldering pin to protect the latter from damage during general processing of the male terminal row. After the male terminal row is properly assembled to a terminal seat, the slat portion is broken off at the break points, leaving the soldering pins connected to rear ends of
20 the male terminals.

After the male terminals have been inserted into the terminal seat, they do not require further processes, such as cutting, trimming, and bending. Therefore,
25 time and labor for manufacturing and assembling the male terminal row is largely reduced, and a finish

product with enhanced precision may be obtained.

BRIEF DESCRIPTION OF THE DRAWINGS

5 The structure and the technical means adopted by the present invention to achieve the above and other objects can be best understood by referring to the following detailed description of the preferred embodiments and the accompanying drawings, wherein

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Fig. 1 is a plan view of a conventional male terminal row;

Fig. 2 is a side view of the conventional male terminal
15 row of Fig. 1;

Fig. 3 shows the conventional male terminal row of Fig. 1 is preliminarily inserted into a terminal seat and a connecting band on the male terminal row is broken
20 off from the male terminal row;

Fig. 4 shows individual male terminals on the conventional male terminal row of Fig. 1 are pushed into the terminal seat to predetermined depths;

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Fig. 5 shows an initially straight soldering pin of

each male terminal on the conventional male terminal row of Fig. 1 is bent to form a bent soldering pin;

Fig. 6 shows the initially irregular rear ends of the soldering pins of the male terminals on the conventional male terminal row of Fig. 1 are cut to flush with one another;

Fig. 7 is a plan view of a male terminal row according to the present invention;

Fig. 8 is a sectioned side view of the male terminal row of Fig. 7;

Fig. 9 is a fragmentary enlarged view of Fig. 7;

Fig. 10 is a plan view showing the male terminal row of the present invention is assembled to a terminal seat; and

Fig. 11 is a side view of Fig. 10.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Please refer to Figs. 7 and 8 that are plan and sectioned side views, respectively, of a male terminal row B

according to the present invention, and to Fig. 9 that is a fragmentary enlarged view of Fig. 7. As shown, the male terminal row B of the present invention mainly includes a slat portion 5 and a plurality of equally spaced male terminals 6 integrally extended from a front edge of the slat portion 5. The male terminals 6 have been separately set to required lengths.

Each of the male terminals 6 has a front portion formed into a connecting pin 61, and a rear portion formed into an insertion section 62 to locate behind the connecting pin 61. The insertion section 62 is connected at two sides of a rear end to the slat portion 5 via two break points 51. Areas on the slat portion 5 separately opposite to a middle point of the rear end of each insertion section 62 are punched to form a plurality of elongated first tear-off slots 52. Material torn off from each of the first tear-off slots 52 keeps connected at a front end to the rear end of the insertion section 62 and is backward bent to form a bent soldering pin 63. That is, the front end of the soldering pin 63 is connected to the middle point of the rear end of the insertion section 62 of the male terminal 6. Accordingly, when the slat portion 5 is broken off from the male terminals 6, the soldering pins 63 remain to integrally connect to rear ends of

the male terminals 6.

The slat portion 5 before broken off is also punched at predetermined positions to form a plurality of second
5 tear-off slots 53. Material torn off from each of the second tear-off slots 53 keeps connected at an end to the slat portion 5 and is backward bent to form a straight protection pin 54. A distance by which the protection pin 54 rearward projects from the slat portion 5 is
10 slightly larger than that of the bent soldering pin 63. Therefore, the protection pins 54 are able to protect the bent soldering pins 63 against undesired damage when the male terminal row B is under electroplating, packaging or storing.

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For example, when the male terminal row B of the present invention is under some processing, such as electroplating, the rearward projected protection pins 54 are adapted to protect the bent soldering pins 63
20 of the male terminals 6 against bending and deformation due to external forces. Moreover, the rearward projected protection pins 54 also function as a good guide in electroplating to obtain an electroplated coating with stable size and position, and to avoid
25 deflection of the male terminals 6 during the electroplating.

In addition, when the male terminal row B of the present invention is received in a circular tray during a manufacturing process thereof, the rearward projected protection pins 54 also prevent spacer sheets (not shown) in the tray from directly pressing against the soldering pins 63. Therefore, when the male terminal row B is subjected to an external force, it is the protection pins 54 that are first compressed by the external force, and the soldering pins 63 or the entire male terminals 6 are protected from deformation due to the external force.

In manufacturing the male terminal row B of the present invention, the number of the male terminals 6 to be provided on the row and an overall length of individual male terminals 6 are decided in advance according to different products for which the male terminal row B is designed. The slat portion 5 of each male terminal row B is provided at two lateral sides with breaking sections 55 to facilitate easy cutting of the male terminal row B.

Please refer to Figs. 10 and 11 that are plan and side views, respectively, of the male terminal row B of the present invention assembled to a terminal seat 3, such

as a male seat for a memory card. To assemble the male terminal row B to the terminal seat 3, the following steps are included: (1) inserting the connecting pins 61 of different lengths on the male terminal row B into
5 insertion slots 31 provided in the terminal seat 3, and pushing the male terminal row B forward until the insertion sections 62 are fully located in the insertion slots 31; and (2) breaking off the slat portion 5 at the break points 51 to remove the slat portion 5 and
10 accordingly the protection pins 54 from the male terminal row B, allowing the soldering pins 63 to remain at rear ends of the male terminals 6. Since there are two male terminal rows B to be assembled to the terminal seat 3, the above steps are repeated to assemble a second
15 male terminal row B to the terminal seat 3 after the first one has been properly assembled. As can be found from the above assembling steps, it is very simple to assemble the male terminal row B of the present invention to the terminal seat 3 in a time and labor saving manner.

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Since the male terminals 6 of the male terminal row B of the present invention are not subject to deflection or deformation due to external forces during the manufacturing and assembling thereof, the male
25 terminals 6 do not require any further process after they are inserted into the terminal seat 3. Accordingly,

only a very small error within a linear tolerance would be found between the soldering pins 63 and soldering points provided on a circuit board to which the male terminal seat 3 is connected. Thus, the male terminal
5 row B of the present invention is particularly suitable for soldering to the circuit board with the highly precise surface mounting technique.

In brief, the male terminal row provided by the present
10 invention has simple structure and is easy to assemble to the terminal seat. The problems of high accumulated error and high bad yield caused by complicate assembling steps as found in the conventional male terminal row are therefore eliminated in the present invention.

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What is claimed is:

1. A male terminal row for inserting into a terminal seat, comprising a slat portion and a plurality of
5 male terminals integrally connected to a front edge of said slat portion;

said slat portion being punched at areas separately opposite to a middle point of a rear end of each said
10 male terminal to form a plurality of elongated first tear-off slots, such that material torn off from each of said first tear-off slots keeps connected at a front end to the rear end of said male terminal and is backward bent to form a bent soldering pin; said
15 slat portion being further punched at predetermined positions to form a plurality of second tear-off slots, such that material torn off from each of said second tear-off slots keeps connected at an end to said slat portion and is backward bent to form a
20 protection pin, a distance by which said protection pins are rearward projected from said slat portion being slightly larger than that of said soldering pins; and

25 each of said male terminals having a front portion formed into a connecting pin, and a rear portion

formed into an insertion section located behind said connecting pin; said insertion section being connected at two sides of a rear end to said front edge of said slat portion via two break points;

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whereby when said male terminal row is inserted into said terminal seat to locate in place in said terminal seat, said slat portion may be broken off at said break points with said bent soldering pins remaining connected at front ends to rear ends of said insertion sections of said male terminals.

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2. The male terminal row as claimed in claim 1, wherein said slat portion is provided at two lateral sides with breaking sections to facilitate easy breaking of said slat portion off said male terminal row.

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