

BURN-IN BOARD AND BURN-IN SYSTEM

BACKGROUND OF THE INVENTIONField of the Invention

5 The present invention relates to a burn-in board and a burn-in system.

Related Art

10 As an apparatus for performing a burn-in test which is one type of screening test for revealing an initial failure of a device such as an electronic component thereby to remove an initial failure product, a burn-in apparatus is known. In the burn-in apparatus, a burn-in board to which a plurality of semiconductor devices being devices under test is attached is housed inside the burn-in apparatus,
15 an electrical stress is given by applying a predetermined voltage, and a thermal stress is given by heating or cooling air inside the burn-in apparatus, whereby the initial failure is revealed.

 In such a burn-in apparatus, since a prolonged burn-in test for several hours to several ten hours is performed, in order to improve
20 a test efficiency it is general that a plurality of devices under test is attached to one burn-in board and a plurality of these burn-in boards is inserted into a burn-in apparatus to perform a burn-in test (for example, see Patent Document 1: Japanese Patent Laid-Open Publication No. 2006-308517).

25 Fig. 1 is a plan view showing a structure of a rear surface of a burn-in board BIB. As shown in Fig. 1, in a front edge side in an insertion direction of the burn-in board BIB, there is formed an insertion edge EG from which a plurality of insertion electrode pads INPD is exposed. Further, a circumference of the burn-in board BIB
30 is provided with a frame FR for reinforcing the burn-in board BIB. Further, a front surface of the burn-in-board BIB is provided with a plurality of sockets to which devices under test are to be attached.

 As shown in Fig. 2, a burn-in apparatus is provided with an extension board EXB which has a female edge connector EC having a
35 plurality of contact pins in correspondence with the aforementioned insertion edge EG. The insertion edge EG in the burn-in board BIB

front edge side is inserted into the edge connector EC in a burn-in apparatus side, whereby the insertion electrode pad INPD in the insertion edge EG and the contact pin in the edge connector EC are electrically connected, so that the burn-in apparatus and the burn-in board BIB can be electrically connected. To the burn-in board BIB, power (electric power) and a variety of test signals necessary for performing a burn-in test are supplied via the insertion edge EG and the edge connector EC. Further, by performing the burn-in test, a variety of test result signals the device under test generates is outputted from the burn-in board BIB to the burn-in apparatus.

Meanwhile, recently, the number of devices under test to be tested by one burn-in board BIB has been increased, and it is necessary to increase a current amount to be supplied from a burn-in apparatus to the burn-in board BIB. On the other hand, compatibility is also required so that an existing burn-in board BIB having been used up to now can be also used without change in a new burn-in apparatus, wherever possible. Therefore, in view of maintaining compatibility, it is not preferable to increase a supplyable current amount by changing an insertion edge EG of a burn-in board BIB and an edge connector EC of an extension board EXB.

A current value which can be made flow from a burn-in apparatus to a burn-in board BIB is restricted by a heat resistant temperature of a casing portion of an edge connector EC since the casing portion is made of a resin. That is to say, a heat resistant temperature of the edge connector is necessary to fulfill the following formula.

Heat resistant temperature of edge connector > Burn-in temperature + Temperature rise by current + Amount of safety factor

For example, if a heat resistant temperature of an edge connector is 170°C, a burn-in temperature is 155°C at the maximum, and an amount of a safety factor is 5°C, a temperature rise by a current is required to be less than 10°C. In a case that power is supplied by using ten pins among contact pins of the edge connector, flowing of a current of 3 A to each contact pin makes flowing of a current of 30 A. At this time, the temperature of the edge connector rises by about 10°C. Therefore, 30 A is a maximum current value

and a current larger than this current value cannot be made flow.

As described above, a conventional burn-in board BIB cannot cope with a large current in addition to maintaining compatibility with the existing burn-in board, due to restriction of heat resistance of an edge connector EC in an extension board EXB of a burn-in apparatus.

Further, in inserting an insertion edge EG of the conventional burn-in board BIB into the edge connector EC in a burn-in apparatus side, if a strong force is applied to an insertion hole of the edge connector by the insertion edge EG, there is a possibility that the edge connector EC is destroyed.

SUMMARY OF THE INVENTION

Hence, an object of the present invention is to provide a burn-in board and a burn-in system which can improve a performance in addition to maintaining compatibility with an existing burn-in board.

In order to solve above problems, a burn-in board according to the present invention includes:

a burn-in board main body portion including in its front surface a plurality of sockets to which devices under test are to be attached; and

an insertion edge provided in the burn-in board main body portion,

the burn-in board provided to be electrically connected to a connection destination board by inserting the insertion edge into an edge connector provided in the connection destination board, and the burn-in board further includes:

a power source reception connector to be electrically connected to a power source supply connector when the insertion edge is inserted into the edge connector, the power source supply connector being provided in the connection destination board and supplying power to the burn-in board main body portion, wherein

the power source reception connector is provided in a rear surface of the burn-in board main body portion.

Furthermore, the burn-in board may further include:

a reinforcing member which reinforces the burn-in board main

body portion, the reinforcing member being provided in the rear surface of the burn-in board main body portion, wherein

the power source reception connector is built in part of the reinforcing member.

5 Furthermore, the reinforcing member may be formed of metal and electrically connected to the power source reception connector.

Furthermore, the power source reception connector may be female,

10 the power source supply connector may be male and may include a bar-shaped pin to be inserted into the power source reception connector.

Furthermore, the power source reception connector may be disposed in a manner that a tip portion of the pin abuts on a guide
15 portion of the power source reception connector before the insertion edge is inserted into the edge connector.

Furthermore, the power source reception connector may be soldered to a power source pattern of the burn-in board main body portion, and

20 the power source pattern may be electrically connected to the plurality of sockets.

Furthermore, the power source reception connector may be connected to the power source pattern of the burn-in board main body portion by a power supply cable, and

25 the power source pattern may be electrically connected to the plurality of sockets.

Furthermore, power may not be supplied to the burn-in board main body portion via the insertion edge.

A burn-in system according to the present invention includes:
30 a burn-in board which includes

 a burn-in board main body portion including in its front surface a plurality of sockets to which devices under test are to be attached, and

 an insertion edge provided in the burn-in board main
35 body portion; and

 a burn-in apparatus which includes a connection destination

board including an edge connector, the connection destination board being electrically connected to the burn-in board as a result that the insertion edge is inserted into the edge connector, wherein

the connection destination board includes a power source supply connector to supply power to the burn-in board main body portion, and

the burn-in board includes a power source reception connector provided in a rear surface of the burn-in board main body portion, the power source reception connector being electrically connected to the power source supply connector when the insertion edge is inserted into the edge connector.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a plan view showing a structure of a rear surface of a conventional burn-in board.

Fig. 2 is a perspective view showing a connection portion of the conventional burn-in board and an extension board.

Fig. 3 is a front view of a burn-in apparatus in a burn-in system according to a first embodiment of the present invention.

Fig. 4 is a side view of the burn-in apparatus in the burn-in system of Fig. 3.

Fig. 5 is a plan layout view for explaining disposition of a burn-in board, an extension board, and an automatic insertion/removal mechanism in the burn-in system according to the first embodiment of the present invention.

Fig. 6 is a perspective view showing a rear surface side of a connection portion between the burn-in board and the extension board in the burn-in system according to the first embodiment.

Fig. 7 is a perspective view enlargedly showing the rear surface side of the connection portion between the burn-in board and the extension board of Fig. 6.

Fig. 8A is a I-I cross-sectional view explaining a positional relationship between the insertion edge and the power source reception connector of the burn-in board of Fig. 7, and the edge connector and the pin of the extension board.

Fig. 8B is a I-I cross-sectional view explaining a connection

state in which the pin is inserted into the power source reception connector of Fig. 7 and the insertion edge is inserted into the edge connector.

Fig. 9 is a perspective view showing a connection portion
5 between a burn-in board and an extension board in a burn-in system according to the second embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

Hereinafter, respective embodiments of the present invention
10 will be described with reference to the drawings. It should be noted that the embodiments described below do not restrict a technical range of the present invention. Further, in the drawings attached to the present specification, a scale, a vertical/horizontal ratio and so on are properly changed from those of an actual object and exaggerated
15 for the convenience's sake of ease of illustration and understanding. (First Embodiment)

Fig. 3 is an overall front view of a burn-in system according to a first embodiment of the present invention, and Fig. 4 is a side view of the burn-in system shown in Fig. 3.

20 As shown in aforementioned Fig. 3 and Fig. 4, a burn-in apparatus 10 in the burn-in system according to the present embodiment includes a chamber 20 therein. The chamber 20 is divided by an insulated wall or the like and a plurality of burn-in boards BIB is housed therein. In an example of the present
25 embodiment, slots 30 for supporting the burn-in boards BIB are disposed in two columns of 24 steps, enabling 48 burn-in boards BIB in total to be housed in the chamber 20. However, the number of the burn-in boards BIB able to be housed in the chamber 20 and a disposition of the burn-in board BIB in the chamber 20 can be
30 changed arbitrarily. It should be noted that by those burn-in board BIB and burn-in apparatus 10, the burn-in system of the present embodiment is constituted.

Further, the burn-in apparatus 10 is provided with a door 40, and by making the door 40 in an open state, the burn-in board BIB
35 becomes able to be put into/ removed from the chamber 20, while by making the door 40 in a closed state, the chamber 20 comes to

constitute a closed space. In the burn-in apparatus 10 according to the present embodiment, a temperature in the chamber 20 is possible to be raised and lowered in accordance with a predetermined sequence.

5 The burn-in board BIB is inserted into the slot 30 of the burn-in apparatus 10 of Fig. 3, in which a guide supporting mechanism to support the burn-in board BIB is formed, however, in a case of a burn-in apparatus of such a type to house a carrier rack in whole in the chamber 20, a guide supporting mechanism to support
10 the burn-in board BIB is not formed in the slot 30.

 Fig. 5 is a diagram showing the burn-in board BIB according to the first embodiment, an extension board EXB to be electrically connected when the burn-in board BIB is inserted into an edge connector EC, and an automatic insertion/removal mechanism 100
15 for automatically performing insertion/removal of the burn-in board BIB. In Fig. 5, one burn-in board BIB, one or more (three, in the present embodiment) extension board(s) EXB, and the automatic insertion/removal mechanism 100 corresponding thereto are shown as a plan view viewed from a front surface side of the burn-in board
20 BIB.

 As shown in Fig. 5, the burn-in board BIB has a burn-in board main body portion BIBM, and a surface of the burn-in board main body portion BIBM is provided with a plurality of sockets SKT disposed in a matrix state. To each of those sockets SKT, a
25 semiconductor device being a device under test is attached. The number of the sockets SKT provided in one burn-in board BIB is arbitrary. In other words, the number of the devices under test attachable to one burn-in board BIB is arbitrary.

 An insertion edge EG is formed in an insertion direction front
30 edge side of the burn-in board main body portion BIBM. In the present embodiment, for example, the insertion edges EG are formed in three places along a width direction of one burn-in board BIB. The number and disposition of the insertion edges EG formed in one burn-in board is arbitrary. A circumference of the burn-in board
35 main body portion BIBM is provided with a frame FR for reinforcing a strength of the burn-in board main body portion BIBM. In the

present embodiment, the frame FR is constituted by a metal member such as an aluminum alloy, for example.

Each slot 30 of the burn-in apparatus 10 is provided with one or more (three, in the present embodiment) extension board(s) (connection destination board) EXB in correspondence with the burn-in board BIB. The edge connector EC is provided at a position corresponding to the insertion edge EG in each extension board EXB. In the present embodiment, in correspondence with three insertion edges EG, three edge connectors EC are respectively provided in the width direction of the corresponding extension board EXB. The edge connector EC is a female connector, and when the insertion edge EG is inserted into this female connector, the edge connector EC and the extension board EXB and the burn-in board BIB are electrically connected via the edge connector EC and the insertion edge EG.

It should be noted that the number of the extension boards EXB may be arbitrary. The number of the edge connectors EC provided in one extension board EXB is also arbitrary.

Further, the edge connector EC of each extension board EXB is provided in its rear surface side with a power source supply connector PSC having three pins P and supplying power to the burn-in board main body portion BIBM. However, as shown in Fig. 5, only the pin P of the power source supply connector PSC can be observed from the front surface side. Further, the insertion edge EG of the burn-in board BIB is provided in its rear surface side with a power source reception connector PRC at a position corresponding to the pin P. However, as shown in Fig. 5, the power source reception connector PRC cannot be observed from the front surface side. Details of these power source supply connector PSC and power source reception connector PRC will be described later.

It should be noted that, in the present invention, the power source includes a high-voltage side power source and a low-voltage side power source. Therefore the power source supply connector PSC also includes one supplying a ground voltage, for example.

When observing an edge connector EC side in an insertion direction from inside the chamber 20, the edge connector EC and the

pin P are exposed from the insulated wall 50. In other words, the chamber 20 and an extension board EXB side are thermally separated by the insulated wall 50 and thereby a temperature inside the chamber 20 can be kept at a desired temperature.

5 A driver board (illustration omitted) provided inside the burn-in apparatus 10 is connected to an edge portion in an opposite side of the edge connector EC in the extension board EXB. Thus, the burn-in board BIB is to be connected to the driver board of the burn-in apparatus via the edge connector EC and the insertion edge
10 EG.

 The driver board generates a test signal necessary in performing a burn-in test and supplies the burn-in board BIB therewith, and also supplies the burn-in board BIB with power necessary for the device under test to operate. Therefore, the test
15 signal and power are supplied to the device under test inserted into the socket SKT of the burn-in board BIB, via the edge connector EC and the insertion edge EG. Further, a test result signal the device under test generates by the burn-in test is outputted to the extension board EXB via the edge connector EC and the insertion edge EG and
20 outputted to the driver board. In addition, as will be described later, power is supplied to the device under test inserted into the socket SKT of the burn-in board BIB via the pin P of the power source supply connector PSC and the power source reception connector PRC.

 Further, the burn-in apparatus 10 according to the present
25 embodiment is provided with the aforementioned automatic insertion/removal mechanism 100. The automatic insertion/removal mechanism 100 is provided correspondingly to each slot 30, and automatically inserts the insertion edge EG of the burn-in board BIB into the edge connector EC of the extension board
30 EXB by a mechanical operation, and automatically removes the insertion edge EG of the burn-in board BIB from the edge connector EC of the extension board EXB by a mechanical operation. It should be noted that concrete operations of the automatic insertion/removal mechanism 100 will be described later.

35 Next, a structure of the rear surface side of the burn-in board BIB will be described with reference to Fig. 6 and Fig. 7.

Fig. 6 is a perspective view showing a rear surface side of a connection portion between the burn-in board BIB and the extension board EXB in the burn-in system according to the first embodiment.

Fig. 7 is a perspective view enlargedly showing the rear surface side of the connection portion between the burn-in board BIB and the extension board EXB of Fig. 6.

As shown in Fig. 6 and Fig. 7, the burn-in board BIB includes three connection portion side frames (reinforcing member) FRC provided in the rear surface of the burn-in board main body portion BIBM. The connection portion side frame FRC reinforces the burn-in board main body portion BIBM.

Each connection portion side frame FRC is provided in a removal direction side of the corresponding insertion edge EG in a manner to be almost parallel to the corresponding insertion edge EG. These connection portion side frames FRC are provided in the same positions as those of the connection portion side frames an existing burn-in board has. Thereby, in the burn-in board BIB of the present embodiment, it is not necessary to change a component or a structure surrounding the connection portion side frame FRC from those of the existing burn-in board. However, the position of the connection portion side frame FRC may be different from that of a connection portion side frame the existing burn-in board has.

The burn-in board BIB includes nine female power source reception connectors PRC provided in the rear surface of the burn-in board main body portion BIBM. Three power source reception connectors PRC are built in part of the respective connection portion side frames FRC. These power source reception connectors PRC are formed of metal and have metal leads 310. The lead 310 is soldered to a power source pattern (printed wiring) formed in the burn-in board main body portion BIBM. Thereby, the power source reception connector PRC is fixed to the connection portion side frame FRC and the burn-in board main body portion BIBM. This power source pattern is connected to power source terminals of the plural sockets SKT. Therefore, a current (power) inputted from the power source reception connector PRC is supplied to the socket SKT, and a current flowing out from the device under test is supplied to the

power source reception connector PRC. However, the number of the power source reception connectors PRC is arbitrary. By increasing/decreasing the number of the power source reception connectors PRC, a maximum current value which can be dealt with
 5 can be increased/decreased.

The connection portion side frame FRC is formed of metal and is electrically connected to the power source reception connector PRC. Further, each connection portion side frame FRC is electrically insulated from the burn-in board main body portion BIBM and the
 10 frame FR surrounding the burn-in board main body portion BIBM. Since the connection portion side frame FRC is made of metal, the connection portion side frame FRC functions as a reinforcing member for preventing warpage of the burn-in board main body portion BIBM, similarly to the frame FR. However, the connection portion side
 15 frame FRC may be formed by an insulator such as a resin.

Each extension board EXB has the male power source supply connector PSC. The power source supply connector PSC has three bar-shaped pins P to be connected to the power source reception connectors PRC, and a connector main body portion PSCM to which
 20 the pin P is fixed. The pin P extends in the removal direction and its tip portion PT is formed in a hemispheric shape. The pin P and the connector main body portion PSCM are formed of metal.

The connector main body portion PSCM of the power source supply connector PSC is provided on the edge connector EC.
 25 However, the connector main body portion PSCM may be provided on the extension board EXB in an insertion direction side of the edge connector EC.

The power source supply connector PSC is connected to a power unit of the burn-in apparatus 10 by a bus bar (wiring)
 30 extending in the insertion direction via the driver board and the like (illustration omitted). The bus bar is a wiring exclusively for supplying power and has a large allowable current value.

Three power source supply connectors PSC are electrically insulated from one another. Therefore, for example, three power
 35 source supply connectors PSC can be used, respectively, as one for a first power source system, one for a second power source system,

and one for a ground system. Otherwise, it is possible that, for example, two power source supply connectors PSC are used as ones for the ground system and the other power source supply connector PSC is used as one for the power source system.

5 The power source reception connector PRC is disposed in a position where the power source reception connector PRC becomes electrically connected to the power source supply connector PSC when the insertion edge EG is inserted into the edge connector EC. At this time, the pin P of the power source supply connector PSC is
10 inserted into a corresponding insertion hole 300 of the power source reception connector PRC, whereby the both are connected to each other.

 The insertion edge EG is provided with a plurality of insertion electrode pads INPD in a row in a width direction. These insertion
15 electrode pads INPD are electrically connected to the sockets SKT by the printed wiring formed in the burn-in board BIB. Therefore, a test signal and a current (power) inputted from this insertion electrode pad INPD is supplied to the socket SKT, while a test result signal outputted from the device under test is supplied to the
20 insertion electrode pad INPD. It should be noted that though illustration is omitted in Fig. 5 insertion electrode pads INPD are formed also in a front surface of the insertion edge EG in a similar disposition pattern to those of Fig. 6 and Fig. 7 in the present embodiment.

25 It should be noted that in Fig. 6 and Fig. 7, illustration of the insulated wall 50 is omitted for clarifying explanation. That is to say, as described in Fig. 5, the insulated wall 50 exists between the burn-in board BIB and the extension board EXB.

 Next, a connection between the burn-in board BIB and the
30 extension board EXB will be described by using Fig. 8A and Fig. 8B.

 Fig. 8A is a I-I cross-sectional view explaining a positional relationship between the insertion edge EG and the power source reception connector PRC of the burn-in board BIB of Fig. 7, and the edge connector EC and the pin P of the extension board EXB. Fig. 8B
35 is a I-I cross-sectional view explaining a connection state in which the pin P is inserted into the power source reception connector PRC of Fig.

7 and the insertion edge EG is completely inserted into the edge connector EC.

As shown in Fig. 8A and Fig. 8B, the insertion hole 300 is formed in the power source reception connector PRC. A guide portion 301 is formed in an entrance side (insertion direction side) of the insertion hole 300. The guide portion 301 has a taper-shaped ramp. An inside diameter of the guide portion 301 in the entrance side (insertion direction side) is larger than an inside diameter in a removal direction side.

10 The pin P of the power source supply connector PSC is inserted into the insertion hole 300 via the guide portion 301. On this occasion, the pin P contacts a metal surface of the inside of the insertion hole 300 and is electrically connected thereto. Thereby, the device under test inserted into each socket SKT is electrically
15 connected to the power unit of the burn-in apparatus 10.

As shown in Fig. 8A and Fig. 8B, an insertion hole 200 is formed in the edge connector EC, and the insertion edge EG of the burn-in board BIB is inserted into the insertion hole 200.

The inside of the insertion hole 200 is provided with a plurality of contact pins CNPN in a row in a width direction.

A contact portion 202 of the contact pin CNPN contacts the insertion electrode pad INPD of the insertion edge EG and electrically contacted thereto.

20 The contact portions 202 of the contact pins CNPN are formed in the respective contact pins CNPN in a manner to be positioned in one line in the width direction.

A contact portion 204 to be electrically connected to the extension board EXB side is formed in an edge portion in an insertion direction side of the contact pin CNPN.

30 The extension board EXB is provided with an extension side electrode pad (illustration omitted) contacting and electrically connected to the contact portion 204 of the contact pin CNPN. The extension side electrode pad is formed in a row in a width direction.

In the present embodiment, the extension side electrode pad of the extension board EXB and the contact portion 204 of the contact
35 pin CNPN are fixed by solder or the like. However, the extension side

electrode pad of the extension board EXB and the contact portion 204 of the contact pin CNPN are not necessarily required to be fixed. In other words, it suffices if the extension side electrode pad of the extension board EXB and the contact portion 204 of the contact pin CNPN are in contact with each other.

The extension side electrode pad on the extension board EXB is electrically connected to a wiring of the driver board via the printed wiring formed on the extension board EXB. Thereby, the device under test inserted into each socket SKT is electrically connected to the wiring on the driver board.

A connection between the burn-in board BIB and the extension board EXB is performed as below.

First, a user inserts the burn-in board BIB where the device under test is inserted into the socket SKT into the slot 30. Insertion of the burn-in board BIB into the slot 30 is sometimes performed manually by the user, and is sometimes performed by a mechanical automatic transfer mechanism. Further, if the slot 30 is formed in the chamber 20 of the burn-in apparatus 10 as in the present embodiment, the burn-in board BIB is pushed out of a carrier rack and inserted into the slot 30, while in a burn-in apparatus of a type in which a carrier rack in whole is housed into a chamber 20, a state shown in Fig. 8A is made by inserting the carrier rack into the chamber 20.

As shown in Fig. 8A, the power source reception connector PRC is disposed in a manner that the tip portion PT of the pin P of the power source supply connector PSC is inserted into the guide portion 301 and abuts thereon before the insertion edge EG is inserted into the edge connector EC. Namely, after the tip portion PT of the pin P of the power source supply connector PSC is inserted into the guide portion 301 and abuts thereon, the insertion edge EG is inserted into the edge connector EC.

By this constitution, if a position into which the user has inserted the burn-in board BIB is not a right position (position shown in Fig. 8A), the tip portion PT of the pin P abuts on the guide portion 301 of the power source reception connector PRC before the insertion edge EG abuts on the insertion hole 200 of the edge connector EC.

The power source reception connector PRC and the pin P, being made of metal, are harder to be destroyed than the edge connector EC is. Besides, as described above, since the guide portion 301 of the power source reception connector PRC has a tapered shape, when a

5 force in the insertion direction is kept to be added to the burn-in board BIB, the burn-in board BIB moves in a manner that the tip portion PT of the pin P slides along the tapered shape of the guide portion 301, and thereby the position of the burn-in board BIB can be corrected to the right position as in Fig. 8A. Further, since the plural

10 pins P and the plural power source reception connectors PRC exist, accuracy of the position is more improved.

When the user further inserts the burn-in board BIB from the state of Fig. 8A, the frame FR of the burn-in board BIB abuts on a stopper portion 102 of the automatic insertion/removal mechanism

15 100 shown in Fig. 5 and stops before reaching the state of Fig. 8B. As is known from Fig. 5, the automatic insertion/removal mechanism 100 has the stopper portions 102 formed in right and left sides thereof, on which tips FRT of the frame FR of the burn-in board BIB abut respectively. Thereby, a stop position in the insertion direction

20 of the burn-in board BIB is positioned. At this time, the insertion edge EG of the burn-in board BIB is partially inserted into the insertion hole 200 of the edge connector EC and the pin P becomes in a state of being partially inserted into the guide portion 301 and the insertion hole 300 of the power source reception connector PRC.

25 As shown in Fig. 5, an engaging pin 104 for mechanically inserting the burn-in board BIB into the edge connector EC is formed in the automatic insertion/removal mechanism 100. An engaging projection is formed in the engaging pin 104 of the automatic insertion/removal mechanism 100 (illustration omitted). Further, a

30 burn-in board opening portion is formed in the rear surface of the burn-in board BIB (illustration omitted). When the tip FRT of the frame FR of the burn-in board BIB abuts on the stopper portion 102 of the automatic insertion/removal mechanism 100, it becomes in a state where the engaging projection is placed below the burn-in

35 board opening portion.

When the automatic insertion/removal mechanism 100 starts

up in such a state, the engaging pin 104 of the automatic insertion/removal mechanism 100 moves in a direction of the burn-in board opening portion. Then, the engaging projection of the engaging pin 104 enters the inside of the burn-in board opening portion. Subsequently, the engaging pin 104 of the automatic insertion/removal mechanism 100 moves in the insertion direction of the burn-in board BIB, and, by this moving, makes the burn-in board BIB move in the insertion direction. Thereby, the insertion edge EG of the burn-in board BIB is completely inserted into the edge connector EC of the extension board EXB. This is the state shown in Fig. 8B.

In the present embodiment, in order to protect the insertion edge EG of the burn-in board BIB, a tip of the insertion edge EG is designed not to collide against the edge connector EC. Namely, it is designed so that a movement amount of the engaging pin 104 of the automatic insertion/removal mechanism 100 is adjusted thereby to keep the tip of the insertion edge EG from coming in contact with a wall surface 210 in the back in the insertion direction of the insertion hole 200 of the insertion edge EG.

As described above, according to the burn-in system according to the present embodiment, the burn-in board main body portion BIBM has the power source reception connector PRC in its rear surface so that the power source reception connector PRC comes to be electrically connected to the power source supply connector PSC provided in the extension board EXB when the insertion edge EG is inserted into the edge connector EC. Thereby, without changing the insertion edge EG and the edge connector EC from existing ones, that is, without significantly changing design of the burn-in board BIB, a large current can be made to flow via the power source supply connector PSC and the power source reception connector PRC. Therefore, it is possible to maintain compatibility with the existing burn-in board. Further, since the power source supply connector PSC is provided separately from the edge connector EC, a large current does not flow to the edge connector EC, and a temperature rise of the edge connector EC can be suppressed. Further, since the power source reception connector PRC is provided in the rear surface

of the burn-in board main body portion BIBM, it is not necessary to decrease the number of the sockets SKT provided in the front surface. Therefore, the burn-in test can be performed efficiently.

Further, according to the present embodiment, the power
5 source reception connector PRC is built in part of the connection
portion side frame FRC which the existing burn-in board also has.
Thereby, the power source reception connector PRC is not provided in
a component mounting portion in the rear surface of the burn-in
board BIB, and thus it is possible not to decrease a component
10 mounting area from a component mounting area in the existing
burn-in board. Further, heat of the power source supply connector
PSC and the power source reception connector PRC can be dispersed
to the entire connection portion side frame FRC, so that heat release
can be performed via the connection portion side frame FRC.
15 Thereby, local heat generation can be avoided to improve a heat
release performance.

Further, since the connection portion side frame FRC is formed
of metal and is electrically connected to the power source reception
connector PRC, a resistance value from the power source supply
20 connector PSC to the power source reception connector PRC can be
reduced.

Further, since the power source reception connector PRC is
disposed in a manner that the tip portion PT of the pin P is inserted
into the guide portion 301 and abuts thereon before the insertion
25 edge EG is inserted into the edge connector EC, breakage of the edge
connector EC can be prevented, as described above.

Further, since the burn-in board BIB and the burn-in
apparatus 10 of the present embodiment are constituted without
changing the insertion edge EG and the edge connector EC from
30 those of the existing burn-in board, the existing burn-in board can be
inserted into the edge connector EC of the burn-in apparatus 10 of
the present embodiment and used without making a change thereto.
(Second Embodiment)

A second embodiment is different from the first embodiment
35 in terms of a connection between a power source reception connector
PRC and a power source pattern in a burn-in board BIB.

Fig. 9 is a perspective view showing a connection portion between a burn-in board BIB and an extension board EXB in a burn-in system according to the second embodiment of the present invention. As shown in Fig. 9, a power source reception connector PRC is fixed to a connection portion side frame FRC with a metal screw 400. The screw 400 is connected to one end of a power supply cable 410. The other end of the power supply cable 410 is connected to a power source pattern 420 of a burn-in board main body portion BIBM. The power source pattern 420 is connected to a predetermined component 430 such as a fuse and a capacitor on the burn-in board main body portion BIBM, and is connected to power source terminals of a plurality of sockets SKT.

It should be noted that, as is also stated in the first embodiment, since the power source includes also a low-voltage side power source, the aforementioned power source pattern 420, for example, may be a pattern to which a ground voltage is supplied.

The connection portion side frame FRC is one to which a change is added in terms of a shape of a connection portion side frame an existing burn-in board has so that the power source reception connector PRC can be mounted. Other constitution is the same as that of the first embodiment, and the same element is given the same reference numeral/symbol and explanation thereof is omitted.

As described above, according to the present embodiment, the power source reception connector PRC is fixed to the connection portion side frame FRC with the screw 400, and is electrically connected to the power source pattern 420 of the burn-in board main body portion BIBM by the power supply cable 410. Thereby, a large current can be supplied to an arbitrary place (place where a power source enforcement is desired) of the burn-in board main body portion BIBM, without newly providing a power source pattern to which the lead 310 of the power source reception connector PRC is soldered as in the first embodiment. Therefore, it is possible to easily make a burn-in board capable of dealing with a large current without changing a wiring pattern of an existing burn-in board.

Further, an effect similar to that of the first embodiment can

be obtained.

It should be noted that the present invention is not limited to the aforementioned embodiments, and various changes may be made therein. For example, in the aforementioned embodiments, an example is explained in which power is supplied to the device under test via the power source supply connector PSC, the power source reception connector PRC, the insertion edge EG, and the edge connector EC, but it is possible to constitute so that power is supplied via neither the insertion edge EG nor the edge connector EC. In such a case, it is not necessary to use the insertion electrode pad INPD in the insertion edge EG for supplying power, and thus all the insertion electrode pads INPD in the insertion edge EG can be used as ones for the test signal. Accordingly, it is possible to increase the number of the signals which can be supplied from the burn-in apparatus 10 to the burn-in board BIB, and the burn-in test can be performed more efficiently.

Further, in the aforementioned embodiments, the insertion electrode pads INPD are formed in both front surface and rear surface of the insertion edge EG of the burn-in board BIB, but the insertion electrode pad INPD can be formed only in one of the front surface and the rear surface of the insertion edge EG. In such a case, it is possible that the contact pin CNPN is provided only in an upper side or only in a lower side of the edge connector EC in conformity to the burn-in board BIB.

Further, in the aforementioned embodiments, a case in which the edge connector EG is provided in the extension board EXB is described as an example, a connection destination board in which the edge connector EG is provided is not limited to the extension board EXB. In other words, as long as a board is a connection destination board to which a burn-in board BIB is to be electrically connected, in every sort of board the edge connector of the present invention can be provided and the burn-in board BIB of the present invention can be used.

Further, in the aforementioned embodiments, an example is described in which the power source reception connector PRC is female and the power source supply connector PSC is male, but the

power source reception connector PRC may be male and the power source supply connector PSC may be female.

CLAIMS

1. A burn-in board comprising:
 - a burn-in board main body portion comprising in its front surface a plurality of sockets to which devices under test are to be attached; and
 - an insertion edge provided in the burn-in board main body portion,
 - the burn-in board provided to be electrically connected to a connection destination board by inserting the insertion edge into an edge connector provided in the connection destination board, and
 - the burn-in board further comprising:
 - a power source reception connector to be electrically connected to a power source supply connector when the insertion edge is inserted into the edge connector, the power source supply connector being provided in the connection destination board and supplying power to the burn-in board main body portion, wherein
 - the power source reception connector is provided in a rear surface of the burn-in board main body portion,
 - the power source reception connector is female,
 - the power source supply connector is male and comprises a bar-shaped pin to be inserted into the power source reception connector,
 - the power source reception connector is disposed in a manner that a tip portion of the pin abuts on a guide portion of the power source reception connector before the insertion edge is inserted into the edge connector.
2. The burn-in board according to claim 1, further comprising:
 - a reinforcing member which reinforces the burn-in board main body portion, the reinforcing member being provided in the rear surface of the burn-in board main body portion, wherein
 - the power source reception connector is built in part of the reinforcing member.
3. The burn-in board according to claim 2, wherein

the reinforcing member is formed of metal and electrically connected to the power source reception connector.

4. The burn-in board according to any one of claims 1 to 3, wherein

the power source reception connector is soldered to a power source pattern of the burn-in board main body portion, and

the power source pattern is electrically connected to the plurality of sockets.

5. The burn-in board according to any one of claims 1 to 3, wherein

the power source reception connector is connected to the power source pattern of the burn-in board main body portion by a power supply cable, and

the power source pattern is electrically connected to the plurality of sockets.

6. The burn-in board according to any one of claims 1 to 5, wherein

power is not supplied to the burn-in board main body portion via the insertion edge.

7. A burn-in system comprising:

a burn-in board which comprises

a burn-in board main body portion comprising in its front surface a plurality of sockets to which devices under test are to be attached, and

an insertion edge provided in the burn-in board main body portion; and

a burn-in apparatus which comprises a connection destination board comprising an edge connector, the connection destination board being electrically connected to the burn-in board as a result that the insertion edge is inserted into the edge connector, wherein

the connection destination board comprises a power source supply connector to supply power to the burn-in board main body

portion, and

the burn-in board comprises a power source reception connector provided in a rear surface of the burn-in board main body portion, the power source reception connector being electrically connected to the power source supply connector when the insertion edge is inserted into the edge connector,

the power source reception connector is female,

the power source supply connector is male and comprises a bar-shaped pin to be inserted into the power source reception connector,

the power source reception connector is disposed in a manner that a tip portion of the pin abuts on a guide portion of the power source reception connector before the insertion edge is inserted into the edge connector.