

IC TEST HANDLER/

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to an IC test handler for conveying various IC devices such as semiconductor memories when making tests on such IC devices.

Description of the Related Art

In cases where a semiconductor testing system is used to run tests on IC devices such as semiconductor memories, a plurality of IC devices to be tested have to be placed at predetermined testing positions. Use is made of an IC test handler to effectively perform such an IC device placement work.

The IC test handler comprises a mechanism section which performs the conveyance and rearrangement of the IC devices, a variety of sensors which detect the state of action or abnormality, a control section which controls actions effected by the mechanism section on the basis of outputs from these sensors, an operative section with which the operator enters various set data and action instructions, and a panel display which displays various setting screens or alarms at the time of the occurrence of abnormality.

By entering model numbers and feature data of the IC devices through the operative section, it is possible

to run tests on multiple different types of IC devices. Customer trays for use in feed and withdrawal of the IC devices have a variety of geometries since they are prepared by the user of the IC test handler. Therefore, in the case of using various types of customer trays prepared by the user, there is a need to enter in advance data on detailed geometries and so forth of the customer trays.

The control section detects, e.g., the state of conveyance of the fed IC devices by supervising outputs from the various sensors. In case an abnormality has occurred such as a fall of the IC devices in the process of the conveyance, the control section immediately stops the conveyance action, allowing a blink of a red lamp or an alarm display. For example, an alarm post upon the occurrence of abnormality such as a fall of the IC devices is carried out by displaying various alarm codes of several tens of digits which have previously been prepared in correspondence with the type of abnormality which has occurred, on a panel display provided on the IC test handler.

By the way, in the case of the above-described IC test handler, the user performs the entry of various data or of various action instructions while viewing the operation screen of the panel display. However, a multiplicity of terms peculiar to the IC test handler are used for the display, so that there may arise a problem

that it is difficult for the operator not having a certain level of skill to grasp the detailed contents. For this reason, manual books have been prepared which explain various set items and action instructions. Thus, by consulting the manual books, the operator can know the contents which the set items in question or the like means.

The alarm display upon the occurrence of abnormality in the IC test handler is carried out by displaying predetermined alarm codes on the panel display, so that there may arise a deficiency that it is difficult for the user to grasp the contents thereof from merely viewing the alarm codes. Ordinarily, manual books have been prepared which describe e.g., the cause of occurrence corresponding to the various alarm codes and method of canceling the alarm. Thus, by consulting the manual books, the operator can acquire detail information on the alarm generated.

However, there exist a diversity of set items and action instructions as well as diverse causes of occurrence of alarms (for instance, the alarms include jam, error, status, guide, etc.). This makes it difficult for an unfamiliar operator to consult the manual books to find the set item in question and so forth or the cause of occurrence. Usually, the explanations on the various set items or on the various alarms described in the manual books may employ short

expressions using technical terms because the manual books are often written for the skilled person which has an experience of operation of the IC test handler. This means that an unfamiliar operator may not necessarily understand with ease. In contrast, it may also be conceivable to explain in detail using expressions which everyone can understand, although the explanation excluding the technical terms will become difficult to understand for the skilled operator.

The product life of the IC test handler itself is of the order of 10 to 15 years. In case an alteration of software has occurred within the period of time as a result of the addition or change of the IC devices to be tested, there arises every time a need to revise the entirety or part of the manual book. If this revise work is not performed at appropriate timing, the displayed action instructions and so forth are not correlated with the contents of description of the manual books, making it difficult for the user to look at the items in question or the cause of alarms or the method of cancellation. For example, in cases where when the revised pages of the manual book are distributed in pay at user's request, the request has not been made, or where in spite of the existence of the revised pages, the manual book has not undergone any replacement work of those pages, the actually displayed action instructions, etc., and alarm codes are not correlated with the contents described in

the manual book.

In this manner, it is not easy for everyone to understand the contents of the various set items, action instructions, etc., appearing on the operation screen by consulting the manual books. A method has thus been desired which enables everyone to easily understand the contents of the set items and so forth irrespective of the level of the skill. Furthermore, it is not easy for everyone to understand a series of dealing methods from the occurrence of an alarm to the cancellation thereof by consulting the manual books. A method has thus been desired which allows everyone to simply understand the contents of alarms and the method of canceling the alarm irrespective of the level of the skill.

It is therefore the object of the present invention to provide an IC test handler ensuring an easy acquisition of detail information on post contents of various items contained in the operation screen and of alarms generated.

SUMMARY OF THE INVENTION

According to a preferred embodiment, an IC test handler of the present invention comprises display means for displaying predetermined post contents; help file storage means for storing therein help files containing at least detail information on items of the post contents displayed by the display means; and help function execution means for executing the help files to display



the detail information.

Detail information on various post contents of the IC test handler is stored in the help files, which files are executed by the help function execution means so that upon a screen display of the various post contents, detail information on these post contents can be displayed. By virtue of the provision of the help files corresponding to items contained in the post contents, detail information on these items can easily be obtained. Even though the post contents have been changed as a result of change of a software used in the IC test handler, the contents of the help files are updated simultaneously with the change of the software so that items contained in the post contents are properly associated with the detail information on these items.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is an external view of an IC test handler in accordance with an embodiment of the present invention;

Fig. 2 is a diagram showing a schematic configuration of a mechanism section of the IC test handler;

Fig. 3 is a block diagram schematically showing a control mechanism for the control of actions of the IC test handler;

Fig. 4 is a flowchart showing a procedure of actions of a help screen display which is performed

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concurrently with a system operation screen display;

Fig. 5 is a diagram showing an example of display of a customer tray setting screen which is one of system display screens;

Fig. 6 is a diagram showing a specific example of a help screen which is displayed by the execution of a help file;

Fig. 7 is a diagram showing another example of the help screen;

Fig. 8 is a diagram showing a further example of the help screen;

Fig. 9 is a flowchart showing a procedure of actions performed when an IC device is transferred from a customer tray to a test tray;

Fig. 10 is a flowchart showing a procedure of actions of the IC test handler in case an abnormality has occurred during the ordinary action;

Fig. 11 is a flowchart showing a procedure of actions of an alarm display performed by an input/output processing unit;

Fig. 12 is a diagram showing an alarm message display screen;

Fig. 13 is a diagram showing a display screen appearing when a guide display button is clicked;

Fig. 14 is a diagram showing a display screen on part of which a pop-up window is displayed; and

Fig. 15 is a diagram showing a display screen

appearing when a detail display button is clicked.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The IC test handler of this embodiment will now be described in greater detail with reference to the accompanying drawings.

Fig. 1 is an external view of the IC test handler of the embodiment, showing a front view of a horizontal conveyance type IC test handler by way of example. The IC test handler 100 shown in FIG. 1 comprises a door 110 which is opened or closed to feed and withdraw a plurality of customer trays, an LCD (a liquid crystal display) 112 serving as a display unit which provides an operation screen display required for the various settings and a predetermined alarm display at the time of occurrence of abnormality, a keyboard 114 serving as an operation unit through which are entered various set values, action instructions, etc., related to IC devices to be tested and the customer trays carrying them thereon, and a signal tower 116 with which lights providing different colors depending on the state of action are put on or blinked.

Fig. 2 is a diagram showing a schematic configuration of a mechanism section of the IC test handler 100 having the external appearance depicted in Fig. 1. As shown in FIG. 2, the IC test handler 100 is provided with the mechanical part including a stocker 122, a suction head 126, a loader 128, a soak chamber 130, a test chamber 132, an unsoak chamber 136 and an unloader

138. The mechanical part serves to heat an IC device which has been fed, convey it to a predetermined position and, after the completion of testing, cool it for removal.

The customer tray 120 is a receptacle for keeping a plurality of IC devices 118 therein. Use are made of different customer trays depending on the type and geometry of the IC devices 118. These customer trays are prepared by the user of the IC test handler 100 and have some degrees of freedom of geometry. Thus, size and other various data must be set in advance.

The stocker 122 is intended to accommodate the customer trays 120 carrying thereon untested IC devices 118 and the customer trays 120 carrying thereon IC devices 118 categorized on the basis of test results after testing. Arranged in the stocker 122 is a plurality of stacks each consisting of a multiplicity of customer trays 120 disposed one upon another. In the case of feeding the IC devices 118 to the loader 128 side, IC devices 118 resting on the topmost customer tray 120 of the stack are picked up and placed in a test tray 124, which in turn is transferred to the loader 128. When the topmost customer tray 120 of the stack becomes empty, the empty tray is moved to the bottommost position and thereafter an elevator (not shown) is raised to push up the second topmost customer tray 120 to the topmost position so that the supply of the IC devices 118 is continued. In the case of withdrawing the IC devices 118 from the unloader

138 side, IC devices 118 on the test tray 124 are transferred onto an empty customer tray 120 positioned at the topmost stage of the stack, and the customer tray 120 carrying thereon a predetermined number of IC devices 118 is successively lowered for withdrawal.

The above-described stocker 122 lies at a position where the door 110 of Fig. 1 is opened. For ordinary testing actions, the operator performs both the operation for feeding the customer trays 120 to a predetermined position in the stocker 122 and the operation for withdrawing the customer trays 120 carrying thereon the tested IC devices 118 from the stocker 122.

The suction head 126 is used for the transfer of the IC devices 118 from the customer tray 120 to the test tray 124 and for the transfer of the IC devices 118 from the test tray 124 to the customer tray 120. The suction head 126 picks up the IC device 118 by making the intra-head pressure negative and frees the captured IC device 118 by releasing this negative pressure.

After the IC devices 118 on the customer tray 120 at the topmost stage of any stack in the stocker 122 have been picked up and placed onto the test tray 124 by means of the suction head 126, the loader 128 conveys this test tray 124 toward the soak chamber 130.

The soak chamber 130 is a constant temperature bath which accommodates a plurality of test trays 124 for heating or cooling untested IC devices 118 to keep them

at a predetermined temperature. The test tray 124 conveyed by the loader 128 is positioned at the topmost stage of the soak chamber 130 and thereafter is successively lowered stage by stage. This lowering time is set to a predetermined value so that the IC devices 118 are heated or cooled until reaching a desired temperature. When the test tray 124 arrives at the bottommost stage of the soak chamber 130, it is discharged and conveyed to the test chamber 132.

The test chamber 132 is a constant temperature bath for performing various function tests on the IC devices 118 kept at a predetermined temperature. In the test chamber 132, the IC devices 118 on the test tray 124 discharged from the soak chamber 130 are individually picked up and moved to a contact unit 134. The IC devices 118 are then subjected to various function tests and, after the completion of the testing, are returned to the initial test tray 124. The contact unit 134 is provided with a plurality of IC sockets (not shown). The IC devices 118 are individually fitted to the IC sockets, after which a test head (not shown) is brought into contact with terminals of the IC devices 118 to thereby provide an electric connection of the IC devices 118 with a semiconductor tester 200. After the completion of the electric connection in this manner, the semiconductor tester 200 effects the function tests on the IC devices 118. When the testing on all of the IC devices 118 resting

on the test tray 124 is complete, this test tray 124 is conveyed to the unsoak chamber 136 side.

The unsoak chamber 136 is a constant temperature bath for gently cooling or heating the IC devices 118 in the high temperature or low temperature state during the testing to return the temperature of the IC devices 118 to the ordinary temperature, in order to prevent a rapid application of temperature stress and a dew condensation. Once the test tray 124 carrying the tested IC devices 118 thereon is positioned at the bottommost stage of the unsoak chamber 136, it is successively raised stage by stage so that the temperature of the IC devices 118 is returned to the ordinary temperature by the time when it reaches the topmost stage. The test tray 124 at the topmost stage is discharged from the unsoak chamber 136 and conveyed to the unloader 138.

The unloader 138 sorts the tested IC devices 118 discharged from the unsoak chamber 136 by the non-defective/ defective or by characteristics and transfers them to corresponding customer trays 120. It is previously set that the IC devices 118 belonging to which sorting should be distributed to which customer tray 120.

A sequence control unit (described later) is disposed to provide a series of controls such as the conveyance control for the customer tray 120 and test tray 124, the heating and cooling control in the soak chamber 130 and unsoak chamber 136 and the identifying management

control for the IC devices 118.

Fig. 3 is a block diagram schematically showing a control mechanism for controlling the action of the IC test handler 100 of this embodiment. As illustrated in Fig. 3, the IC test handler 100 of this embodiment comprises a sequence control board 140 having a configuration required to provide a control of the action of the mechanism section shown in Fig. 2 to run the function tests by the semiconductor tester 200; a user interface (I/F) board 160 having a configuration required for the operator to enter various set data or action instructions and required to provide an alarm display, an operation screen display, etc., to the operator; motor controllers (MCs) 170 and 172 which controllably drive a pulse motor or a servo motor (not shown) for moving the loader 128 and unloader 138; and a solenoid valve 174 and a suction sensor 176 provided on each suction head 126 in order to pick up and release the IC device 118 and to detect the captured state thereof.

The sequence control board 140 comprises a sequence control unit 142, an input/output control unit 144, a temperature control unit 146, a user interface (I/F) conversion unit 148, and a tester interface (I/F) unit 150. The sequence control unit 142 includes a processor and a memory and is implemented by executing a predetermined program by use of a dedicated operating system (OS) allowing a plurality of tasks to be processed

in parallel. The input/output control unit 144 serves to control the action of the mechanism section shown in Fig. 2 in response to an instruction from the sequence control unit 152 and sends action instructions to the motor controllers 170 and 172 and to the solenoid valves 174. The input/output control unit 144 detects outputs of the suction sensors 176 to post the sequence control unit 142 on the presence or absence of the IC devices 118. The temperature control unit 146 provides a control of the temperature of the soak chamber 130, the unsoak chamber 136 and the test chamber 132. The user interface conversion unit 148 serves to control input/output of data between the sequence control board 140 and the user interface board 160.

The user interface board 160 includes an input/output processing unit 162 and an input/output interface (I/F) unit 164. The input/output processing unit 162 is a personal computer body including a processor and a memory. Using an operating system (e.g., Windows (registered trademark) supplied by Microsoft, Co., Ltd.) widely used in general personal computers, the input/output processing unit 162 performs input processing of various data or action instructions, display processing, and predetermined help screen display processing upon the occurrence of an alarm or concurrent with the operation screen display. The input/output interface unit 164 serves to provide a

connection of the input/output processing unit 162 with the LCD 112, the keyboard 114, a mouse 180, a hard disk drive (HDD) 182 and a speaker 184. The input/output interface unit 164 is in the form of a connector adapted for a predetermined standard in conformity with equipment to be connected. The hard disk drive 182 stores therein a help file necessary for the help screen display. Although the mouse 180 is used as a pointing device by way of example, other pointing device such as a joystick is also available.

(Input Actions of Various Set Data and Action Instructions Using Operation Screen)

Description will then be made of an action effected when a predetermined operation screen is displayed prior to the ordinary action to enter various set data or action instructions. Fig. 4 is a flowchart showing an action procedure of a help screen display performed concurrently with a system operation screen display. For instance, consideration is given of an input operation screen when entering various set data on the customer tray 120 prepared by the user of the IC test handler 100.

Previous to the ordinary action of the IC test handler 100, the input/output processing unit 162 displays on the LCD 112 a system operation screen for the entry of various set data or action instructions required for the ordinary action of the IC test handler 100 (step

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301), and activates a help file prepared in advance in order to give some supplementary explanations of items contained in this system operation screen (step 302).

Fig. 5 is a diagram illustrating a system operation screen, showing by way of example the detail of a customer tray setting screen with which are set various data on the customer trays 120 prepared on a user-to-user basis. The customer tray setting screen shown in the diagram allows various set values of the customer tray 120 such as "X pitch", "Y pitch", "Z pitch" and "distance to X head" to be entered separately for the loader (LD) 128 and the unloader (UL) 138. The right-hand area of the customer tray setting screen contains a diagram indicating which set items correspond to which parts of the customer tray 120, thereby contriving to aid the understanding of the operator who enters data on the items.

After the display of the above-described customer tray setting screen, the input/output processing unit 162 supervises whether data on the set items have been entered or not (step 303) and whether the data entry operation has been completed or not (step 304). If an entry of data corresponding to any set item has been made, then the input data are used as a new set value of the item (step 305), after which the procedure returns to step 303 for supervising the data entry.

Although the contents of the customer tray setting

screen are contrived so that the understanding is easy even for the unskilled operator as described hereinabove, the unskilled operator may not necessarily understand the meanings of all of the set items from only the contents of the display appearing on the setting screen. For example, unskilled operator may not fully understand the meanings of the items of "tray setting mode", "device access method", etc.

Concurrently with the display action of the customer tray setting screen described above, the input/output processing unit 162 supervises whether a demand has been issued for display action of a help screen corresponding to each set item (step 306). If the display action of a help screen has been demanded, then display is made of a help screen containing the explanation of the contents of the corresponding set item (step 307). For example, a help file is executed on Windows (registered trademark) which is a general-purpose OS by the input/output processing unit 162 so that it becomes possible to display a predetermined help screen.

Fig. 6 is a diagram illustrating a help screen displayed by the execution of a help file. After clicking "?" mark at the upper right on the customer tray setting screen shown in Fig. 5 with the mouse 180, a pointer of the mouse 180 is moved to an item whose meaning of the term the user wants to know and the mouse 180 is clicked so that a pop-up window containing the meaning of the term

and the like of that item can be displayed as a help screen as shown in Fig. 6.

In general, the help file of Windows (registered trademark) contains a plurality of topics to each of which a piece of information is allocated, and has a function allowing a retrieval of a desired topic through specification of a keyword. The topics are associated with one another so as to facilitate the retrieval of related information.

Fig. 7 is a diagram illustrating a topic retrieval screen for retrieving a topic by specifying a keyword. In the topic retrieval screen shown in FIG. 7, a keyword (e.g., "customer tray") for a desired topic is specified to display a plurality of topics related to this keyword. Any one is selected from among the plurality of topics thus displayed so that the specific contents of that topic are displayed as a new help screen as shown in Fig. 8. Incidentally, Fig. 8 depicts a state where a topic "customer tray size" is selected to allow display of a help screen containing the specific contents thereof.

The help screen displayed through selection of a topic can bear a sentence, a diagram, a table, a static image, a dynamic image, an animation, etc., as needed. A part called a hot spot is provided in such a sentence, diagram, table and static image. This hot spot is clicked with the mouse 180 so as to allow display of a pop-up window containing the meaning of the term of that

portion and related items, as well as display of other topics. Accordingly, in case the understanding of the contents is not fully acquired from the contents (e.g., a sentence or a diagram) contained in the initially displayed help screen, the operator may select a stepwise display of another help screen containing more detailed contents (e.g., a static image or a dynamic image). If necessary, the input/output processing unit 162 is able to provide a contents guidance voice as output from the speaker 184 concurrently with the display actions of various help screens described above.

In this manner, when the system operation screen is displayed in the input-wait state, the IC test handler 100 of this embodiment allows a help screen related to each item on the operation screen to be displayed in response to a demand from the operation, and if needed allows a stepwise display of a more detailed explanation, diagram, image, etc. It is thus possible for each operator to know in detail the contents of each item on the displayed operation screen by specifying the contents of display in accordance with the level of skill.

Even though there has occurred an alteration of a software attendant on the addition or change of the IC devices to be tested, there could be obviated such an inconvenience that each item on the displayed operation screen might not be associated with the contents of explanation thereof, by simultaneously altering a help

file corresponding to the altered software.

(Action in Case of Making Alarm Display upon Occurrence of Abnormality)

Description will then be made of an action in the case of making an alarm display as a result of occurrence of any abnormality in the ordinary action. It is assumed for example that the ordinary action is an action transferring an IC device 118 from the customer tray 120 to the test tray 124 and that the IC device 118 has fallen down in the course of the transfer.

Fig. 9 is a flowchart illustrating an action procedure when the IC device 118 is transferred from the customer tray 120 to the test tray 124, in which a series of actions are carried out by an action task executed by the sequence control unit 142 shown in Fig. 3.

First, the action task (in this embodiment, various tasks performing the ordinary actions are referred to generally as action task for the explanation) executed by the sequence control unit 142 drives the solenoid valves 174 by way of the input/output control unit 144 and causes the suction head 126 to suck the IC device 118 resting on the customer tray 120 (step 401). After the completion of the sucking action, the action task verifies whether or not the IC device 118 has been adhered by suction to the tip of the suction head 126, on the basis of an output from the suction sensor 176 fed to the input/output control unit 144 (step 402).

When the suction of the IC device 118 is verified, the action task then raises the suction head 126 with the IC device 118 sucked (step 403). The raising action ceases once a position sensor (not shown) detects that the IC device 118 has reached a predetermined position (step 404). Afterward, the action task verifies whether or not the IC device 118 has fallen down from the suction head 126 in the process of the raising action (step 405).

When it is verified that the IC device 118 has not fallen down, the action task then drives a motor (not shown) for moving the arm having the suction head 126 fitted thereto so that the suction head 126 moves in a horizontal direction to convey the IC device (step 406), and verifies the stop position from the motor conveyance distance to complete the conveyance action (step 407). Afterward, based on an output from the suction sensor 176, the action task verifies whether or not the IC device 118 has fallen down from the suction head 126 in the process of the conveyance action (step 408).

When it is verified that the IC device 118 has not fallen down, the action task then lowers the suction head 126 with the IC device sucked (step 409). The lowering action comes to a stop once the position sensor detects that the IC device 118 has reached a predetermined position (step 410). Afterward, based on an output from the suction sensor 176, the action task verifies whether or not the IC device 118 has fallen from the suction head

126 in the process of the lowering action (step 411).

Although the action task verifies whether or not the IC device 118 has fallen down in the above steps 402, 405, 408 and 411, it detects the abnormal situation if for example the IC device 118 has fallen down in the course of the lowering action in step 409 (step 412), with the result that an alarm output request is made to a state management task executed by the sequence control unit 142 (hereinafter, referred to simply as "state management task") (step 413).

Fig. 10 is a flowchart illustrating the procedure of actions of the IC test handler 100 in case an abnormality has taken place during the ordinary action, the flowchart showing the actions performed by the state management task. Upon the receipt of an alarm output request from the action task, the state management task verifies that the requested alarm does not overlap with the alarm being currently output (step 501), and the cumulative number of occurrence of this alarm is counted up (step 502). Besides, the case where an output request is made of an alarm overlapping with the alarm being currently output is the case where restart of the action is specified without clearing the abnormal situation causing the occurrence of the alarm so that an alarm output request is made on the basis of the same cause. In this case, the above-described count-up action of the cumulative number of occurrence is not carried out.

There is also a possibility that a structural inconvenience may occur when the cumulative number of occurrence of the same alarm is frequently counted up and results in a larger value. For this reason, the cumulative number of occurrence is supervised to take early measures.

By way of the user interface conversion unit 148, the state management task then requests the input/output processing unit 162 within the user interface board 160 to display an alarm message, with the result that the input/output processing unit 162 makes a predetermined alarm display on the screen of the LCD 112 (step 503). Furthermore, by way of the input/output control unit 144, the state management task allows an alarm buzzer (not shown) to issue an alarm sound for informing the user of the occurrence of an abnormal situation (step 504). The state management task then allows the signal tower 116 to blink in red (step 505) and brings the action of the entire IC test handler 100 to a stop (step 506).

In this manner, the stage management task performs a series of processes upon the occurrence of an abnormal situation, and the action stop state of the entire IC test handler 100 continues until the operator gives an instruction to restart the ordinary action.

Description will then be made of an alarm display action of the input/output processing unit 162 in response to an alarm display request from the above-

described state management task. Fig. 11 is a flowchart illustrating a procedure of actions of the alarm display performed by the input/output processing unit 162. Upon a receipt of an alarm display request from the state management task, the input/output processing unit 162 displays a predetermined alarm message corresponding to an abnormal situation which has occurred (step 601), and to give a supplementary explanation of the contents thereof, it activates a help file which has been prepared in advance (step 602).

Fig. 12 illustrates an alarm message display screen. An alarm message appearing on the display screen shown in FIG. 12 consists of alarm codes of the order of several tens of lines and has the same contents as those of the conventional alarm display. Therefore, it is not easy for the unskilled operator to understand the contents of the alarm generated and the method of canceling it from a mere viewing of the display.

Concurrently with the alarm message display action, the input/output processing unit 162 supervises whether or not the operator demands a guide display of the explanation of the alarm display contents as well as of a method of canceling the abnormal situation (step 603). When the operator clicks a "guide display" button on the display screen shown in Fig. 12 using the mouse 180, the input/output processing unit 162 displays a specific explanation of the contents corresponding to the alarm

message which has hitherto appeared as well as a method of canceling the alarm (step 604).

Fig. 13 is a diagram illustrating a display screen appearing when the "guide display" button is clicked. As shown in the diagram, this display screen contains sentences indicative of the specific contents of the content explanation and the method of cancellation, and simultaneously it contains a diagram, a table or a static image such as a picture to facilitate the understanding of these sentences. Thus, viewing of these display contents enables the operator to easily understand the meaning of the alarm message and to be informed of how to cancel the alarm generated.

For example, the display screen of Fig. 13 and display screens depicted in Figs. 14 and 15 described hereinbelow are created and displayed by executing a help file on Windows (registered trademark) which is a general-purpose OS. This help file contains a plurality of topics to each of which a piece of information is allocated, and it is characterized in that the topics are associated with one another so as to facilitate the retrieval of related information. In the case of the screen shown in Fig. 13, a part called a hot spot is provided in the sentences of the content explanation, sentences of the method of cancellation, diagram, table and static image. This hot spot is clicked with the mouse 180 so as to allow display of a pop-up window

containing the meaning of the term of that portion and so forth as shown in Fig. 14. After clicking "?" mark at the upper right on the screen, a pointer of the mouse 180 may be moved to an item whose meaning of the term the user wants to know so that the above pop-up window is displayed by clicking the mouse 180.

Taking into consideration a case of further displaying a detail guide, the display screen of Fig. 13 is provided with a "detail guide" button. It is to be appreciated that the "detail guide" button need not be provided in cases where it is easy to understand the explanation of the contents shown in Fig. 13 and where it is also easy to understand the method of canceling the alarm generated.

In case the "detail guide" button is provided, the input/output unit 162 supervises whether or not the operator has demanded a display of the detail guide (step 605). When the "detail guide" button is clicked with the mouse 180 by the operator, the input/output unit 162 provides as its output a detail guide on the contents which are considered to be difficult to understand merely by providing sentences, a diagram or a static image of the content explanation or of the method of cancellation on the display screen shown in Fig. 13(step 606).

Fig. 15 is a diagram illustrating a specific example of a display screen appearing when the "detail guide" button is clicked. The display screen shown in

FIG. 15 contains a dynamic image or an animation in addition to a supplementary explanation which is not found in the display screen of Fig. 13. By incorporating a video file into a help file, it is also possible to perform a dynamic image display on a help screen. For example, if, when there is a need to exclude other structures in order to recover an IC device 118 which has fallen down, it is possible to explain the procedure by use of the dynamic image (or animation), the understanding is easy and even the unskilled operator could cancel the alarm in compliance with the display. As needed, the input/output processing unit 162 allows an output of an operation guidance voice from the speaker 184 concurrently with the display shown in Fig. 15.

When a restart switch (not shown) is pressed after the cancellation of the alarm by the operator viewing the display screen in this manner, the state management task sends via the user interface conversion unit 148 to the input/output processing unit 162 an instruction to cease the display of an alarm message screen and of a help screen associated therewith, while simultaneously it sends an instruction via the input/output control unit 144 to switch the signal tower 116 into green lighting and cease the output of the alarm sound from the alarm buzzer. Subsequently, the ordinary action is resumed by the action task.

In this manner, when an alarm display is made as

a result of occurrence of any abnormality, the IC test handler 100 of this embodiment allows a stepwise display of the specific contents and of the method of canceling the alarm in the form of a help screen containing a diagram or a static image in response to a demand from the operator, and if necessary further allows a display of explanation of the term as well as a display of detail guide information containing the dynamic image. Thus, by selecting the display contents in accordance with his/her level of skill, the operator is capable of knowing in detail the contents of the alarm generated and the method of cancellation.

Even though there has occurred an alteration of a software attendant on the addition or change of the IC devices to be tested, there could be obviated such an inconvenience that the contents of the displayed alarm might not be associated with the contents of explanation thereof and so forth, by simultaneously altering a help file corresponding to the altered software.

It is to be appreciated that the present invention is not limited to the above embodiment and that various modifications are possible without departing from the spirit of the present invention. For example, in the above embodiment there has been described a case where displayed as a system operation screen is a customer tray setting screen for performing various settings for the customer tray 120. The same conception applies to a case

where the other setting screen or the action instruction screen is used as the system operation screen. For example, if the user cannot tell what a displayed action instruction means on the system operation screen for instructing an action instruction or when to issue the action instruction, a help screen may be displayed to obtain a specific explanation in the form of sentences, a diagram, a dynamic image, an animation, etc., thereby enabling the user to easily understand what the display items mean without any need to consult a manual book. Although in the above embodiment, a help screen has been displayed upon the entry of various set data or action instructions with the system setting screen displayed, a help file prepared for making the help screen display may contain various types of manual books (a hardware manual book, general specifications, an operation guide, a maintenance manual book, a programming manual book, etc.).

In the above embodiment, there has been envisaged an alarm occurring when the IC device 118 has fallen down in the course of the conveyance. The same concept applies to alarms corresponding to the other abnormal situations.

Although Windows (registered trademark) has been envisaged as an OS used by the input/output processing unit 162, the other OS having the equivalent function is also available. In the above embodiment, the user interface board 160 has been intended to have a function

as a personal computer. However, separately from the IC test handler 100 there may be provided a personal computer so that the above-described online help display action is made on a screen of the thus provided personal computer.

Although the horizontal conveyance type IC test handler 100 has been described in the above embodiment, an IC test handler of automatic fall type or combination of the two types may be employed. In these cases, the online manual book display may be made by superposing a help screen on the system operation screen displayed. Alternatively, such IC test handlers may allow an online manual book display upon the occurrence of an alarm.



WHAT IS CLAIMED IS:

1. An IC test handler comprising:
display means for displaying predetermined post contents;
help file storage means for storing therein help files containing at least detail information on items of said post contents displayed by said display means; and
help function execution means for executing said help files to display said detail information.
2. An IC test handler according to claim 1, wherein
said display means include a display unit having a predetermined display screen, and a processing unit for producing image data on said post contents to be displayed on said display screen.
3. An IC test handler according to claim 1, wherein
said help file storage means are a storage unit for storing said help files in the form of digital data into a predetermined storage medium.
4. An IC test handler according to claim 1, wherein
said help function execution means are a processing unit for executing said help files by use of a predetermined operating system.

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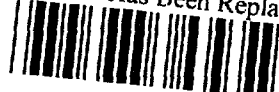
5. An IC test handler according to claim 1, wherein
said post contents are an operation screen
indicative of an operation procedure, and wherein
said detail information contained in said help
files are information on explanation of contents of items
contained in said operation screen.

6. An IC test handler according to claim 5, wherein
said operation screen is a customer tray setting
screen.

7. An IC test handler according to claim 1, wherein
said post contents are alarms corresponding to
abnormality which has occurred, and wherein
said detail information contained in said help
files is information on explanation of contents and on
a method of cancellation of said alarms.

8. An IC test handler according to claim 1, further
comprising abnormality detection means for detecting
occurrence of abnormality, and wherein
said post contents are alarms corresponding to
abnormality which has occurred, and wherein
said detail information contained in said help
files is information on explanation of contents and on
a method of cancellation of said alarms.

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9. An IC test handler according to claim 8, wherein said abnormality detection means detect abnormality which occurs in the process of action of transfer of an IC device between a customer tray and a test tray.

10. An IC test handler according to claim 1, wherein when a specific point on a display screen is selected and specified, said help execution means switch stepwise the contents of said detail information.

11. An IC test handler according to claim 1, further comprising a pointing device for pointing an arbitrary position on a display screen of said display means, and wherein

a display of said detail information by said help function execution means is made on an item pointed by said pointing device among items of said post contents contained said display screen.

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