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(71) Applicant (for all designated States except US): **SAM-SUNG ELECTRONICS CO., LTD.** [KR/KR]; 416, Maetan-Dong, Yeongtong-Gu, Suwon-si, Gyeonggi-Do 442-742 (KR).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **GU, Hyun Sung** [KR/KR]; #608-501, Jookong APT., Byulyang-Dong, Kwachun-City,, Gyeonggi-Do 427-040 (KR).

(74) Agent: **SEO, Bong Seok**; 9th, Seolim Bldg., 649-10, Youksam-Dong, Gangnam-Gu, Seoul 135-080 (KR).

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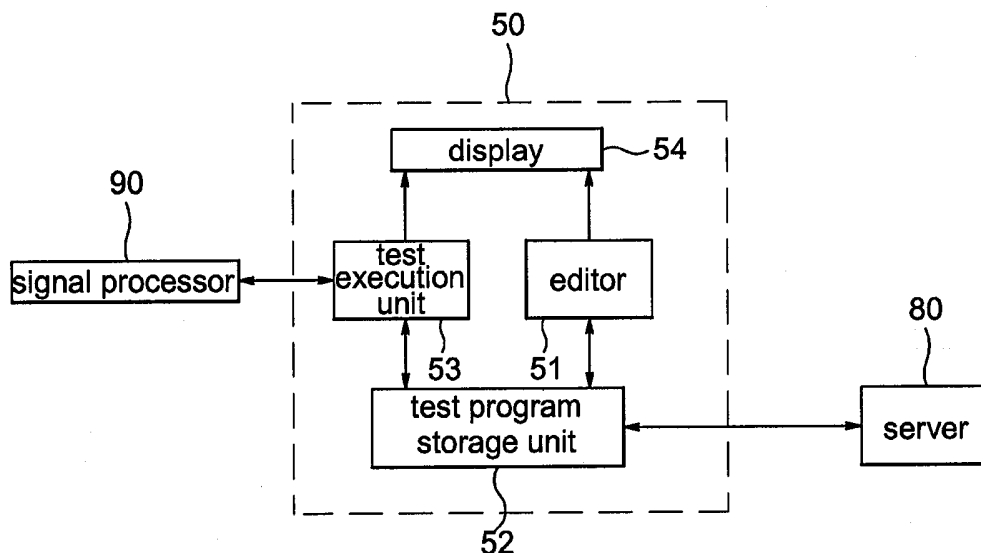
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(54) Title: AN INSPECTION APPARATUS AND METHOD OF A ELECTRONIC DEVICE



(57) Abstract: A test apparatus and a test method of an electronic device are disclosed. The test apparatus according to the present invention includes an editor, a test execution unit and a storage unit. The editor sets test data based on kinds of the electronic device. The test execution unit tests states of the electronic device based on the test data, corresponding to the kinds of the electronic device. The storage unit stores the test data and the test result of the test execution unit. Therefore, the present invention sets test data once and enables a plurality of test apparatuses to perform test operations based on the set test data, thereby eliminating the inconvenience entailed in the prior art techniques wherein test data must be set each a test is to be performed.

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【Description】**【Invention Title】****An inspection apparatus and method of a electronic device****【Technical Field】**

5 The present invention relates to technology for testing electronic devices, and, more particularly, to a test apparatus and a test method that are capable of automatically testing states of various electronic devices.

【Background Art】

10 Recently, with the development of the electronics industry, various electronic devices are produced for utilization in fields such as imaging, communications, etc. Regarding the imaging fields, various audio and video formats have been proposed, and new image processors and image recording media are also continuously produced based on such audio and video formats.

15 Such image recording media are a type of recording means in which images and audio are stored, such as CDs or DVDs, etc. Also, the image processors are a kind of device for reproducing information (video or audio) stored in the image recording media. The image processors include CD players, DVD players, digital camcorders, etc.

20 When producing such image processors, a general product test of whether the image processors are normal is performed. The image processors are sold to the public on the condition that they pass the general quality tests. In the prior art, the image processors are tested as an examiner sees images reproduced through a monitor or hears audio reproduced through a speaker, etc. Also, a test for the image processors is made as to whether they normally reproduce video or audio stored in the recording media, as the examiner observes, with the naked-eye, 25 waveforms of video or audio signals outputted from the images processors using

simple measurement equipment such as an oscilloscope, etc.

On the other hand, prior to being sold to the public, the product must be tested by a plurality of test processes. Also, in order to correctly perform each test process, the examiner must know all the test processes. In addition, each time new products are designed and manufactured, the examiner must consume relatively much time to fully know the test processes for the respective new products.

However, the prior art test method has disadvantages in that, since all the test processes must be fully known by all the examiners, consistency of the test may be decreased such that test reliability can be decreased.

Also, the prior art test method has drawbacks in that, when an examiner does not fully know the test processes, he/she must consume relatively much time to test a product, and it requires a great number of examiners because one examiner can check one product only once. Also, such problems occur in the other electronic devices, such as set-top boxes or mobile telephones, as well as the image processors.

【Disclosure of Invention】

【Technical Problem】

Therefore, it is an aspect of the invention to provide a test apparatus and a method of an electronic device, which are capable of automatically testing states of electronic devices.

It is another aspect of the invention to provide a test apparatus and a method of an electronic device, which are capable of enabling a single test apparatus to test a plurality of test items.

It is further aspect of the invention to provide a test apparatus and a method of an electronic device, which are capable of enabling a plurality of test apparatuses to test electronic devices, using test data which is set once.

It is another aspect of the invention to provide a test apparatus and a method of an electronic device, which are capable of confirming test execution states of electronic devices both remotely and on site.

It is yet another aspect of the invention to provide a test apparatus and a

method of an electronic device, which are capable of providing data corresponding to the entire test result of electronic devices having been tested, such that information regarding corresponding electronic devices, which is based on the data, can be provided to users.

- 5 Additional aspects and/or advantages of the invention will be set forth in part in the description which follows and, in part, will be obvious from the description, or may be learned by practice of the invention.

【Technical Solution】

- 10 In accordance with a first aspect of the present invention, the above and other objects can be accomplished by the provision of a test apparatus of an electronic device comprising: an editor for setting test items, test sequences and test conditions based on kinds of the electronic device; and a test execution unit for testing states of the electronic device based on the test data set by the editor, corresponding the kinds of the electronic device.

- 15 Preferably, the test apparatus further comprises a storage unit for storing the test data set by the editor and the test result of the test execution unit.

Preferably, the test execution unit may store data regarding the test items in the storage unit, in which the data do not satisfy the test conditions.

Preferably, the test apparatus further comprises a display for displaying test execution states of the test execution unit.

- 20 Preferably, the display may display a state of whether or not the test items having been tested satisfy the test conditions.

Preferably, the storage unit may be connected to a server, and data regarding the test data and the test result, which are stored in the storage unit, are transmitted to the server.

- 25 In accordance with a second aspect of the present invention, the above and other objects can be accomplished by the provision of a test apparatus of an electronic device comprising: an editor for setting test data based on kinds of the electronic device; a test execution unit for testing states of the electronic device

based on the test data, corresponding to the kinds of the electronic device; and a storage unit for storing the test data and the test result of the test execution unit.

Preferably, the storage unit may be connected to a server, in which the storage unit transmits data stored therein to the server and receives data stored in the server from the server to store therein.

Preferably, the test execution unit may receive data related to the test data stored in the server from the storage unit, and tests states of the electronic device based on the received test data.

Preferably, the test apparatus further comprises a display, wherein the display receives data related to the test result stored in the sever from the storage unit, and displays the received test result thereon.

In accordance with a third aspect of the present invention, the above and other objects can be accomplished by the provision of a test apparatus of an electronic device comprising: an editor for setting test data based on kinds of the electronic device; and a test execution unit for testing states of a plurality of electronic devices, together, based on the test data.

Preferably, the test apparatus further comprises a display on which test execution states of the plurality of electronic devices are displayed as a single screen.

In accordance with a fourth aspect of the present invention, the above and other objects can be accomplished by the provision of a test method of an electronic device comprising: setting test data based on kinds of the electronic device; testing states of the electronic device based on the test data, corresponding to the kind of the electronic device; and storing the test data and the executed test result in a storage unit.

Preferably, the test method further comprises transmitting data stored in the storage unit to a server connected to the storage unit; and by the storage unit, receiving data stored in the server.

Preferably, the test method further comprises, by the storage unit, receiving test data stored in the server; and testing a state of the electronic device based on the received test data.

In accordance with a fifth aspect of the present invention, the above and other objects can be accomplished by the provision of a test method of an electronic device comprising: setting test items, test sequences, test conditions based on kinds of the electronic device; and testing states of a plurality of electronic devices, together, based on the set test data.

Preferably, the test method further comprises displaying test execution states of the plurality of electronic devices on a display as a single screen.

【Advantageous Effects】

As appreciated through the above aspects, since the present invention can automatically test states of electronic devices, it can provide convenience to examiners and enhance test reliability of the electronic devices, compared with the naked-eye test.

Also, the present invention enables a single test apparatus to test a plurality of test items.

In addition, the present invention enables a plurality of test apparatuses to test electronic devices, using test data which is set once, thereby eliminating repeated setting processes.

Additionally, the present invention permits confirmation of the test execution states of electronic devices at an area wherein the test apparatus are currently testing, and at locations apart from the area, in which the locations are connected to the area via network.

Further, the present invention can provide data regarding the entire test result of electronic devices having been tested to users, such that the users can easily recognize information of a corresponding electronic device, which is based on the data.

【Description of Drawings】

These and/or other aspects and advantages of the invention will become

apparent and more readily appreciated from the following description of the embodiments, taken in conjunction with the accompanying drawings of which:

FIG. 1 is a view illustrating a production line for image processors, which adopts a test apparatus and a test method of an electronic device according to an embodiment of the present invention;

FIG. 2 is a view illustrating a test apparatus of an electronic device according to an embodiment of the present invention;

FIG. 3 is a view illustrating a test unit of the test apparatus of FIG. 2;

FIG. 4 is a detailed view illustrating an editor in the test unit of FIG. 3;

FIG. 5 is a view illustrating a screen for user authentication in the editor of FIG. 4;

FIG. 6 is a view illustrating an edit screen for test data in the editor of FIG. 4;

FIG. 7 is a view illustrating a screen for managing models in the edition screen of FIG. 6;

FIG. 8 is a view illustrating a screen for adding models thereto through the screen for managing models of FIG. 7;

FIG. 9 is a view illustrating a screen for managing test conditions in the edit screen of FIG. 6;

FIG. 10 is a flow chart illustrating a setting procedure of test data for new model in the editor of FIG. 4;

FIG. 11 is a view illustrating a test apparatus of an electronic device according to an embodiment of the present invention;

FIG. 12 is a schematic block diagram illustrating a test apparatus of an electronic device according to an embodiment of the present invention;

FIG. 13 is a screen illustrating test execution states of a plurality of electronic devices in a test execution unit of the test apparatus of FIG. 12;

FIG. 14 is a screen illustrating states wherein tests are proceeding through the screen of FIG. 13;

FIG. 15 is a screen illustrating test statistics for electronic devices through the screen of FIG. 13;

FIG. 16 is a screen illustrating error data through the screen of FIG. 13;

FIG. 17 is a screen illustrating test execution states of the test execution unit in the editor; and

FIG. 18 is a flow chart illustrating a test execution procedure according to an embodiment of the present invention.

【Best Mode】

Reference will now be made in detail to the embodiments of the present invention, examples of which are illustrated in the accompanying drawings, wherein like reference numerals refer to like elements throughout. The embodiments are described below to explain the present invention by referring to the figures.

FIG. 1 is a view illustrating a production line for image processors, which adopts a test apparatus and a test method of an electronic device according to an embodiment of the present invention. The production line is roughly divided into four processes, which are an assembly process 10, a completion process 20, a test process 30 and a shipment process 40. Also, work guideline providing devices 73, 74, and 75, a test unit 50, monitoring terminals 72 and 76, and a server 80 are connected to each other via a dedicated test line, denoted by a solid line. Here, the work guideline providing devices 73, 74, and 75 provide work guideline indicative of working contents of workers in each process. The test unit 50 tests image processor. The monitoring terminals 72 and 76 monitor information for each process. The server 80 manages information, related to the production line and provides the information through the dedicated test line.

The assembly process 10 serves to assemble parts included in a VCR or a DVD player to finish a product. After assembly, a forklift 71 carries the assembled products to a location for performing a completion process 20.

The completion process 20 serves to fabricate an image processor using the assembled product and supplies power to the image processor for operations.

The test process 30 serves to test whether an image processor can normally extract data from an image-recording medium and provide images on a screen,

which is characterized by the present invention.

The shipment process 40 serves to pack the image processor without defect, i.e., passing through the test process 30, and then attach a box label thereto. On the other hand, a defective image processor, detected in the test process 30, is deposited at a specific place.

Meanwhile, information relating to the four respective processes 10, 20, 30 and 40 is shared with each other via the dedicated test line, denoted by a solid line, and may be stored in the server 80.

Here, since the server 80 is connected additionally to an external network as well as the dedicated test line, the monitoring terminal 78 can access information related to the production line, which is stored in the server 80, through the external network. Also, an editor 77 is further connected to the external network. Here, the editor 77 registers or changes contents of test items, test sequences, test conditions (for example, a reference value of image signals, an error range of image signals, etc.), which serve to test an image processor. Although the test apparatus according to the present invention, as shown in FIG. 1, is aligned in the production line for image processors, it can be similarly adopted to other production lines.

FIG. 2 is a view illustrating a test apparatus of an electronic device according to an embodiment of the present invention. The apparatus includes a pin jig 110 on which a PCB 111 to be tested is mounted, a jig controller 130 for controlling operations of the pin jig 110, a signal processor 90 for processing various signals outputted from the pin jig 110 to generate signals which are proper to perform a test operation, a test unit 50 for performing a test operation based on the signals processed by the signal processor 90, and a server 80 for storing data related to tests, such as test items, test sequences, test conditions and test results, etc.

The pin jig 110 installs the PCB to be tested thereon, and may further install an additional device, depending on objects to be tested. For example, in the case that a DVD player is tested, the pin jig 110 may additionally install a DVD-ROM (not shown) thereon, and in the case that a set-top box (which is a set-top box for satellite broadcasting) is tested, the pin jig 110 may further install a tuner (not shown) for receiving satellite signals thereon.

Signals to/from the pin jig 110 vary depending on kinds of electronic devices to be tested, for example, composite signals, S-video signals, component signals (Y, Pb, Pr), RGB signals, digital visual interface (DVI) signals, radio frequency (RF) signals, audio L/R signals, Sony/Philips digital interface (S/PDIF) signals, COAXIAL signals, SCART signals, etc.

On the other hand, when a plurality of PCBs 111 are tested in a plurality of pin jigs 110 based on analysis of an address of a target element to be controlled through control signals transmitted from the test unit 50, the jig controller 130 serves to determine which one of a plurality of pin jigs 110 corresponds to the control signal.

The signal processor 90 serves to convert various signals outputted from the pin jig 110 into a signal for performing a test operation in the test unit 50, and then output it thereto.

The test unit 50, as shown in FIG. 3, includes an editor 51 for setting test items, test sequences and test conditions based on object to be tested when testing electronic devices, a test execution unit 53 for performing a test operation according to the test items, test sequences and test conditions, which are set in the editor 51, executing a test program, a test program storage unit 52 for storing a program performing test processes when performing a test operation and storing data related to the test execution result, and a display 54 for displaying reproduced images, a test proceeding or a test result.

Firstly, the editor 51, which sets test data according to an object to be tested, is described in detail based on its configuration, and also an editing method thereof is also described.

More specifically, the editor 51 serves to set the test items, test sequences and test conditions according to inputted contents which are inputted thereto by an input unit, such as a key board (not shown) or a mouse (not shown). As shown in FIG. 4, the editor 51 includes a remote controller managing unit 51a for managing data necessary for testing remote controller signals, a model management unit 51b for managing models of various products corresponding to an object to be tested, and storing and inquiring the test result based on the models, a test item

management unit 51c for managing all test items which are executable in the test apparatus, a test sequence management unit 51d for designating sequences to be automatically performed according to the models, a test condition management unit 51e for setting necessary test conditions based on test items to provide a reference for determining a defective product.

Firstly, a user must pass through an authentication process to set test items, test sequences and test conditions through the editor 51. FIG. 5 is a view illustrating a screen for user authentication, inputting user identification (ID) and a password. After selecting one of a plurality of products, such as a set-top box, a DVD recorder, a camcorder, a DVD player, a DVD combo-drive, etc. and then inputting the user ID and the password, the user can access corresponding product.

If the user authentication is successful, test data for a corresponding product can be edited. When the test data for remote control signals are set, registration, modification and deletion of remote controller models are performed through the remote controller management unit 51a. When a new remote controller model is registered, a model name of a remote controller, a remote controller type and a button name of corresponding remote controller are inputted thereto. After that, remote controller signals are inputted through a remote controller port (not shown) of the signal process 90 and then data corresponding to the signals are stored, in association with the remote controller buttons therein. On the other hand, when the test execution unit 53 attempts to test a remote controller model whose data are registered in the remote controller management unit 51a, it can perform a test operation based on corresponding data received from the remote controller management unit 51a.

On the other hand, when setting the test items, etc., the editor 51, as shown in FIG. 6, may float a window for setting test items, test sequences and test conditions, such that an examiner can easily input them therein. More specifically, FIG. 6 depicts items, such as a model name, a test list, an operation sequence, etc., which are previously registered in the editor 51. Therefore, an examiner can set test data while he/she is looking at the window.

The examiner can confirm information related to models currently

registered in the model management unit 51b. Here, basic information is displayed on the display 54 based on each model currently registered, as shown in FIG. 7. Also, if a model addition item is selected to add a model to be newly tested thereto, a setting window, as shown in FIG. 8, is displayed on the display 54. Therefore, if
5 basic information related to models to be registered is inputted thereto, corresponding model can be newly registered thereto.

The test item management unit 51c serves to classify information related to all the test items, which are testable through the test apparatus, on an item-by-item basis, in order to manage them. The test item management unit 51c are classified
10 into a test module and a test list. The test module for a test method is classified into a pattern module, an OCR module, an audio signal module, a video signal module, an image module, a DC module, and an ISA module, etc. The test list is classified into specific test items, which can be tested by the test module. For example, when the image module can test the test items, such as an HD level image
15 test, an SD level image test, and a logo image test, etc., in which such specific test items correspond to the test list. The test sequence management unit 51d serves to specifically set test sequences of models to be tested. Namely, in a state wherein tens of tests must be performed in order to test one model, the test sequence management unit 51d can set the test sequence of the plurality of test items based on
20 the tens of tests and designate input/output sequences of a specific signal and a control command, according to each test among the signal processor 90, the jig controller 130, and the pin jig 110.

The test condition management unit 51e serves to set specific test conditions for each test item, which are configured by the test sequence management
25 unit 51d. A number of test conditions must be set on the basis of each test item, and there must be provided a reference determining whether a model is defective or not in test according to the test conditions. FIG. 9 depicts a setting window for test condition according to S-Video signal test, in which the setting window inputs a type of test for Y-signal and C-signal, a peak voltage, an error tolerance, etc.

30 All the test data set by the editor 51 can be stored in the test program storage unit 52. The test program storage unit 52 is implemented with a Hard Disk

Drive (HDD). Test program defines control directions of each of the devices, such as the pin jig 110, the signal processor 90, etc., which are set by the test item management unit 51c or the test sequence management unit 51d. Also, the test program storage unit 52 stores a reference value and an error tolerance of each signal, which are inputted to the test condition management 51e from the electronic device, and then uses them as a comparison object when performing a test operation.

With reference to FIG. 10, a method for setting test data of the electronic device of FIG. 4 is described in detail below. When an examiner acquires access to the editor 51 passing through user authentication process, a setting window related to the editor 51 is floated on the display 54. In order that a new model not stored in the test program storage unit 52 is registered therein, a setting window related to the model management unit 51a is selected to input basic information and a model name, which are related to the new model, in step S100.

When the new model is registered, one of a plurality of test lists, which is should be firstly tested (and which is referred to as a test item), is selected in step S110. After that, a corresponding test module is selected on the basis of the selected test item in step S120. For example, in the case that a START DC test is selected a DC module is selected. Also, input/output sequences of various signals and signal processes, etc., which are necessary for performing the START DC test, can be specifically set.

When the test module is selected, test conditions for performing a corresponding test are inputted therein in step S130. When completing input of the test conditions, a test sequence corresponding to the test item is stored therein in step S140.

A determination is performed as to whether the test item for a corresponding model is completely set in step S150. If there is another test item to be further set, the procedure is returned to step S110 for repeatedly performing the processes, until the test sequence and the test conditions for all the test items are set.

After completely set the test items, if a signal for storing a test method for a corresponding model is selected, the test data set by that time point are stored in the test program storage unit 52.

As such, after storing the test data for a model to be tested in the test program storage unit 52, the test execution unit 53 which performs the test inputs the test data corresponding to the model of the electronic device to be tested, in which the test data is one or some of the test data stored in the test program storage unit 52, and then performs the test based on the inputted test data.

On the other hand, as shown in FIG. 11, the test program storage unit 52 is connected to a server 80, to transmit test data stored therein to the server 80. Here, the test program storage unit 52 stores the test items, test sequence and test conditions, which are set in the editor 51. When test data set in an editor 77 connected to an external network are transmitted to the server 80, the test data are received by the test program storage unit 52 to be used in the test execution unit 53 when performing the test operation. Namely, since test data set in one editor 51 can be shared via the server 80, all the test apparatuses connected to the server through the network can perform tests using test data set by a specific examiner.

Next, a test apparatus and a test method for performing tests using the test data set by the editor 51 are described in detail below.

The test execution unit 53 is implemented with devices, such as a CPU and a RAM, etc., such that a test program is executed in the CPU and the RAM to test PCBs 111 mounted on the pin jig 110 according to the test items and test sequence, which are set by the editor 51. When performing the tests, the test execution unit 53 compares each inputted signal with test conditions stored in the test program storage unit 52 and determines whether each inputted signal is normal.

On the other hand, as shown in FIG. 12, the test apparatus of an electronic device according to an embodiment of the present invention is implemented such that a single test unit 50 is connected to a plurality of pin jigs 110 and a signal processor 90. Here, since the plurality of pin jigs 110, the signal processor 90, the test unit 50 and the server 80 are similar to those in the earlier embodiments of the present invention; their detailed descriptions will be omitted below. However, there is one difference that the embodiment shown in FIG. 12 can simultaneously test a plurality of electronic devices. The number of the electronic devices to be simultaneously tested in a single test unit 50 is dependent upon performance of the

test unit 50.

The test execution unit 53 selects one of test data in the test program storage unit 52 to comply kind of electronic device to be tested of test, and floats an executing window on the display 54 to display corresponding test data therethrough.

5 FIG. 13 depicts a test screen wherein a single test apparatus tests four electronic devices. As such, each channel performs tests according to test sequence set by the editor 51, and compares the test result with the test condition to determine whether the electronic device is normal or defective. Such a test screen, as shown in FIG. 14, shows graphs or corresponding screens based on tests currently performed in
10 each test channel, and displays test items having been currently proceeded at that time and results for the test items thereon. Therefore, the examiner can observe the test processes through the executing window.

After completing the test, data regarding the test result are stored in the test program storage unit 52. Also, the test program storage unit 52 transmits the data
15 regarding the test result to the server 80 connected to the network. Therefore, the examiner can refer to the test results for each electronic device through such a process. Namely, the test results stored in the server 80 can be referred (accessed) through the test unit 50 currently performing the tests and any locations connected to the server 80 through the network. FIG. 15 illustrates test results of each test
20 channel, such as the total number of products having finished the tests, the number of normal or defective products, and defect ratio, etc. Also, FIG. 16 illustrates a screen such that an examiner can confirm error data regarding test items of a product determined to be defective, as it does not satisfy test conditions. Here, as shown in FIG. 17, the test results can be referred through the test execution unit 53, and the
25 test states of the test execution unit 53 can be referred through the editor 51, floating as a window.

Referring to FIG. 18, a procedure wherein a test execution unit performs tests is described in detail below.

When an electronic device is finished and conveyed for test processes, test
30 contests (a test program) stored in the test program storage unit 52 are selected to comply kind and model of the electronic device, and displayed on the display 54

through a test execution window in step S200. Here, step S200 is based on an assumption that test items, test sequences, and test conditions for a corresponding model are completely set in the editor 51 and stored in the test program storage unit 52. Also, step S200 is based on an assumption that the test execution unit 53 is in a state wherein the executing unit 53 receives corresponding test data from the test program storage unit 52 and executes the same, if the test data for the corresponding model are set in other elements or an editor 77 in the test apparatus, except for the test unit 50 performing the tests, and stored in the server 80.

When selecting the test data, a test sequence for testing electronic devices is loaded according to the selected test data in step 210. Channels performing tests are selected in the test apparatus composed of at least more than one channel in step S220. Here, the test can be performed by only a single channel or by a plurality of channels at the same time.

When selecting channels to be tested, the tests are sequentially performed according to the test sequences. Firstly, the test is performed for a first test item in step S230. Based on the test result, determination is performed as to whether corresponding test items satisfy set test conditions in step S240. If the corresponding test items do not satisfy the test conditions, a setting window displays "FAIL" for a corresponding product and the test result is stored in the test program storage unit 52 in step S280. Here, data related to the defective product are also stored therein in step S290. After that, the test procedure is terminated regardless of the remaining test items.

On the other hand, if the corresponding test items satisfy the test condition, the setting window display "PASS" and the test result is stored in the test program storage unit 52 in step S250. After that, a determination is made as to whether tests for all test items have been completed in step S260. When there are further test items to be tested, the procedure is returned to step S230 to sequentially perform a series of processes as mentioned above regarding the remaining test items according to the determined test sequence.

After completing the test items, the test results are displayed on the setting window and stored in the test program storage unit 52 in step S270. In the test

apparatus of an electronic device according to an embodiment of the present invention, the setting window displayed on the display 54, when the editor 51 and the test execution unit 53 are operated, may be variously modified on the basis of the embodiment of the present invention, for example, other graphic screens, such that

5 the modifications can perform the same as the functions of the present invention. Therefore, the graphic screen of the present invention is not limited to the embodiment of the present invention.

Although a few embodiments of the present invention have been shown and described, it would be appreciated by those skilled in the art that changes may be made in these embodiments without departing from the principles and spirit of the invention, the scope of which is defined in the claims and their equivalents.

【CLAIMS】

【Claim 1】 A test apparatus of an electronic device comprising:

an editor for setting test items, test sequences and test conditions based on kinds of the electronic device; and

5 a test execution unit for testing states of the electronic device based on the test data set by the editor, corresponding the kinds of the electronic device.

【Claim 2】 The test apparatus as set forth in claim 1, further comprising:

10 a storage unit for storing the test data set by the editor and the test result of the test execution unit.

【Claim 3】 The test apparatus as set forth in claim 2, wherein the test execution unit stores data regarding the test items in the storage unit, in which the data do not satisfy the test conditions.

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【Claim 4】 The test apparatus as set forth in claim 1, further comprising:

a display for displaying test execution states of the test execution unit.

【Claim 5】 The test apparatus as set forth in claim 4, wherein the display displays a state of whether or not the test items having been tested satisfy the test conditions.

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【Claim 6】 The test apparatus as set forth in claim 2, wherein the storage unit is connected to a server, and data regarding the test data and the test result, which are stored in the storage unit, are transmitted to the server.

25

【Claim 7】 A test apparatus of an electronic device comprising:

an editor for setting test data based on kinds of the electronic device;

a test execution unit for testing states of the electronic device based on the test data, corresponding to the kinds of the electronic device; and

30 a storage unit for storing the test data and the test result of the test execution

unit.

5 **【Claim 8】** The test apparatus as set forth in claim 7, wherein the storage unit is connected to a server, in which the storage unit transmits data stored therein to the server and receives data stored in the server from the server to store therein.

10 **【Claim 9】** The test apparatus as set forth in claim 8, wherein the test execution unit receives data related to the test data stored in the server from the storage unit, and tests states of the electronic device based on the received test data.

15 **【Claim 10】** The test apparatus as set forth in claim 8, further comprising a display, wherein the display receives data related to the test result stored in the sever from the storage unit, and displays the received test result thereon.

20 **【Claim 11】** A test apparatus of an electronic device comprising:
 an editor for setting test data based on kinds of the electronic device; and
 a test execution unit for testing states of a plurality of electronic devices,
together, based on the test data.

25 **【Claim 12】** The test apparatus as set forth in claim 11, further comprising a display on which test execution states of the plurality of electronic devices are displayed as a single screen.

30 **【Claim 13】** A test method of an electronic device comprising:
 setting test data based on kinds of the electronic device;
 testing states of the electronic device based on the test data, corresponding to the kind of the electronic device; and
 storing the test data and the executed test result in a storage unit.

35 **【Claim 14】** The test method as set forth in claim 13, further comprising:
 transmitting data stored in the storage unit to a server connected to the

storage unit; and

by the storage unit, receiving data stored in the server.

【Claim 15】 The test method as set forth in claim 14, further comprising:

5 by the storage unit, receiving test data stored in the server; and
 testing a state of the electronic device based on the received test data.

【Claim 16】 A test method of an electronic device comprising:

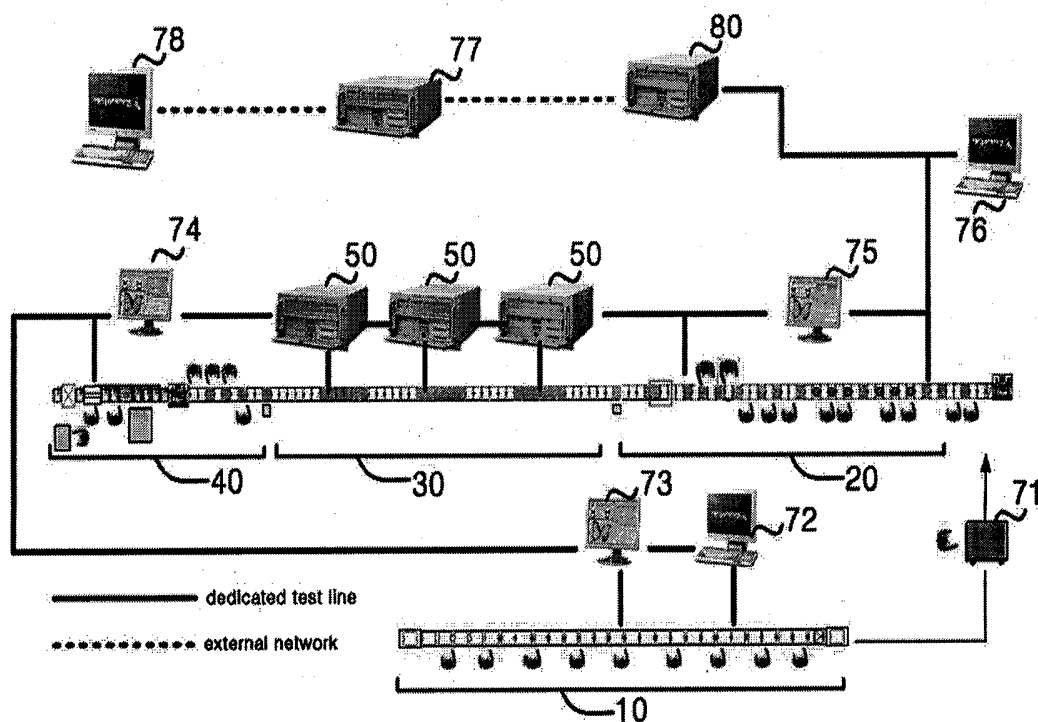
 setting test items, test sequences, test conditions based on kinds of the
10 electronic device; and
 testing states of a plurality of electronic devices, together, based on the set
test data.

【Claim 17】 The test method as set forth in claim 16, further comprising:

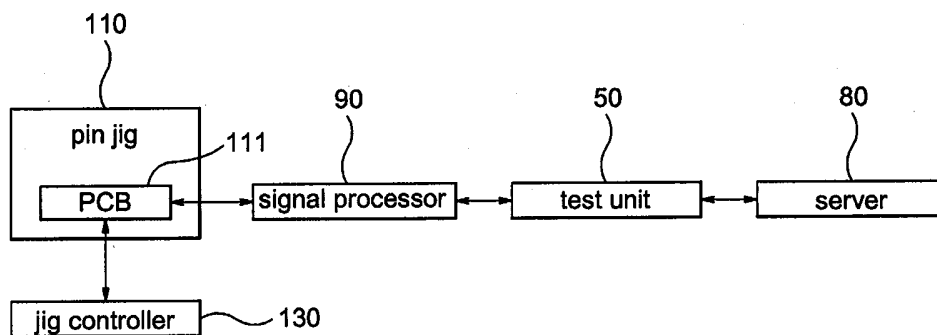
15 displaying test execution states of the plurality of electronic devices on a
display as a single screen.

【DRAWINGS】

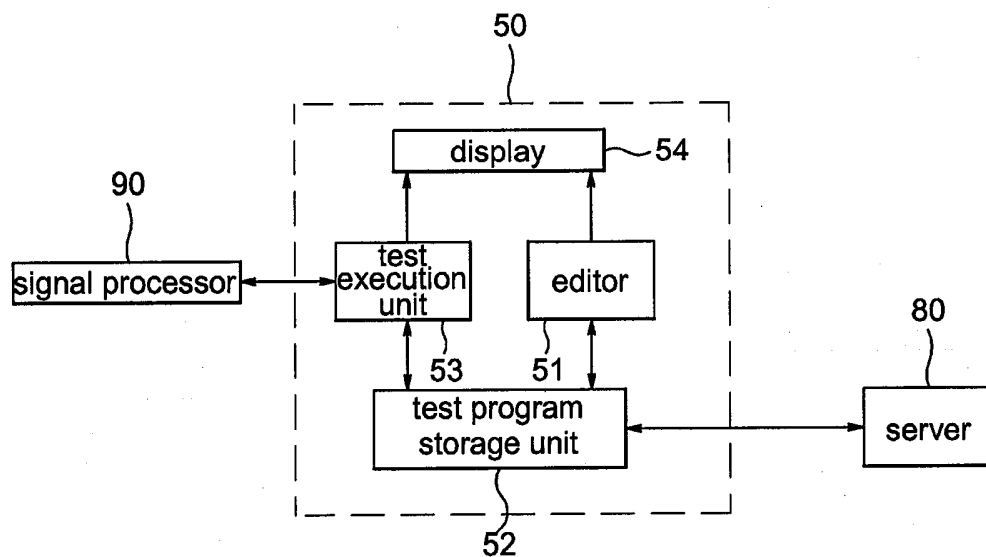
【Figure 1】



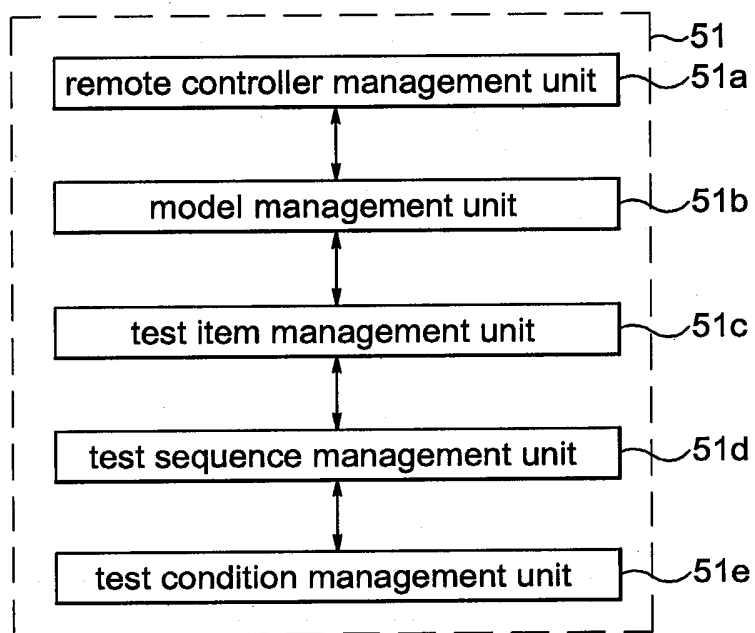
【Figure 2】



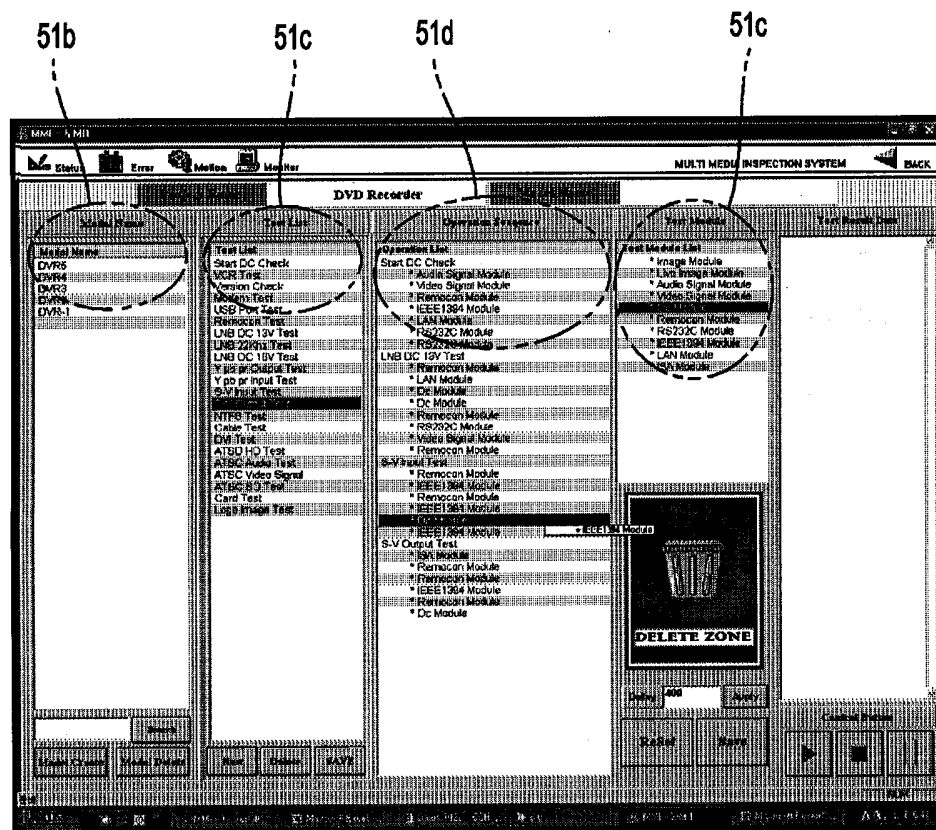
【Figure 3】



【Figure 4】



【Figure 6】



【Figure 7】

Model Manager

ModelName: Search Add Mod Del Close

Target	TOTAL	TOTAL	Records	15	Refresh	
ModelCode	ModelName	Buyer	ModelType	Remicon	COLOR Syst	ScanningType
0007	DVD-P423/XAX	XAX	DVD	SAMSUNG D...	NTSC	BOTH
0008	DVD-P721M/...	SEA	DVD	SAMSUNG D...	NTSC	BOTH
2222	DVD-V2000/X...	SEA	COMBO	SAMSUNG C...	NTSC	INTERFACE
0003	DVD-V2500/X...	SEA	COMBO	SAMSUNG C...	NTSC	BOTH
2223	DVR-4300/GVI	GVI	COMBO	GO-VIDEO C...	NTSC	INTERFACE
0004	DVR-5100/GVI	S/SCIENCE	COMBO	GO-VIDEO C...	NTSC	INTERFACE
0006	NO COLORBAR	SJC	COMBO	JAPAN COM...	NTSC	INTERFACE
0002	SV-DVD3E/X...	SEI	COMBO	SAMSUNG C...	PAL	INTERFACE
0011	SV-DVD3J/XSJ	SAMSUNG	COMBO	SAMSUNG C...	NTSC	INTERFACE
2226	SV-DVD3JG/...	SEI	COMBO	SAMSUNG C...	NTSC	INTERFACE
0001	SV-DVD820M	SAMSUNG	COMBO	2P COMBO	NTSC	BOTH

Base Information

Serial NO	205	Power	120V	J/Shrink	JOG/Shrink
Model Code	0007	Power Freq	60Hz	M/STICK	NONE
Model Name	DVD-P423/XAX	Plug Type	EP-2(2P+2S)	HDD	NONE
Buyer	XAX	Regional	4	AMP	NONE
Model Type	DVD	Video Scan S/W	NONE		
Remicon	SAMSUNG DVD	Video Output S/W	NONE		
Color System	NTSC	VCR-DECK	NONE	Reg User	master
Video Scan Type	BOTH	DVD-DECK	LD	Reg Date	2002/11/22 11:24:02

Signal Information

☐ Video Input 1	☐ Microphone 2	☒ S-Video	☒ Headphone 1	☒ Digital Audio
☐ Video Input 2	☐ Serial Out	☒ YPbPr RCA	☐ Headphone 2	☐ Optical Audio
☐ Audio Input 1	☐ Serial In	☒ YPbPr D1	☐ Audio S1	☐ CEC
☐ Audio Input 2	☒ Video Output 1	☒ Audio Output 1	☐ RF Output	
☐ Microphone 1	☒ Video Output 2	☒ Audio Output 2	☐ RF Input	

【Figure 8】

Model Register/Modify

You can register New Model or modify exist model.

Base Information		Signal Information	
Model Code		☐ All Check	☐ All Uncheck
Model Name		☐ Video Input 1	☐ YPbPr/D1
Buyer		☐ Video Input 2	☐ Audio Output 1
Model Type		☐ Audio Input 1	☐ Audio Output 2
Remocon		☐ Audio Input 2	☐ Headphone 1
Color System		☐ Microphone 1	☐ Headphone 2
Scan Type		☐ Microphone 2	☐ Audio 5.1
Power		☐ Scan Out	☐ RF Output
Power Freq		☐ Scan In	☐ RF Input
Plug Type		☐ Video Output 1	☐ Digital Audio
Regional Code		☐ Video Output 2	☐ Optical Audio
Scantype S/W	NONE	☐ S-Video	☐ CBC
Output Sel S/W	NONE	☐ YPbPr/PCA	
VCR-DECK	NONE		
DVD-DECK	NONE		
U/S/SHUTTLE	NONE		
M/STICK	NONE		
HDD	NONE		
AMP	NONE		

System Component (POSITION INFO) Setting

Save Cancel

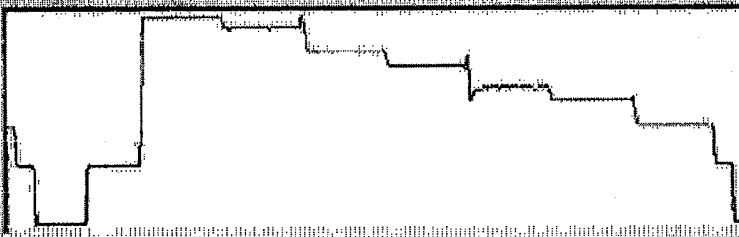
【Figure 9】

Video Signal Input : S-VIDEO

TMS Name	S-VIDEO Test	Model Name	DVD-V2000/XAA
		Trim Name	DVD-V2000 MP3

Y	C
Test Type: Different Range	Test Type: Single Range
Scan Type: INTERACE	Scan Type: INTERACE
Peak-Peak: .880 V	Peak-Peak: .430 V
Error Rate: 30,000 %	Error Rate: 30,000 %
Description:	Description:

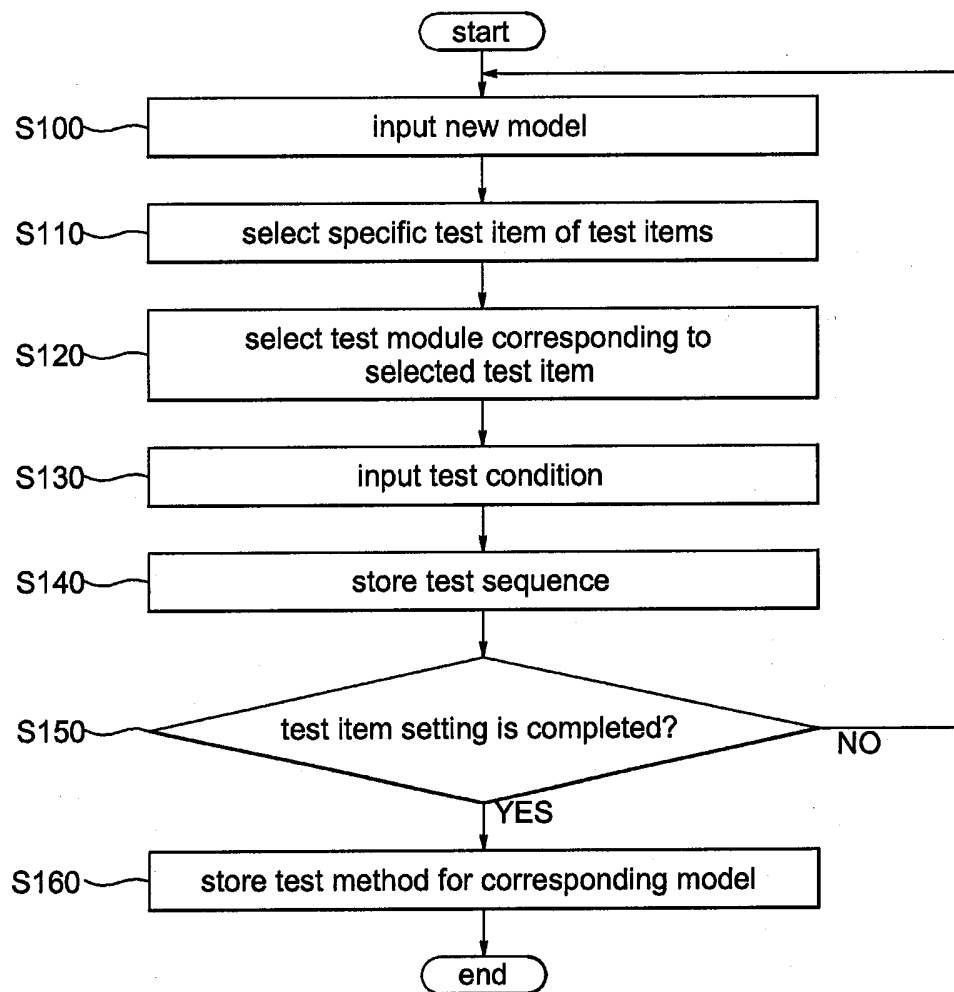
Reference Image



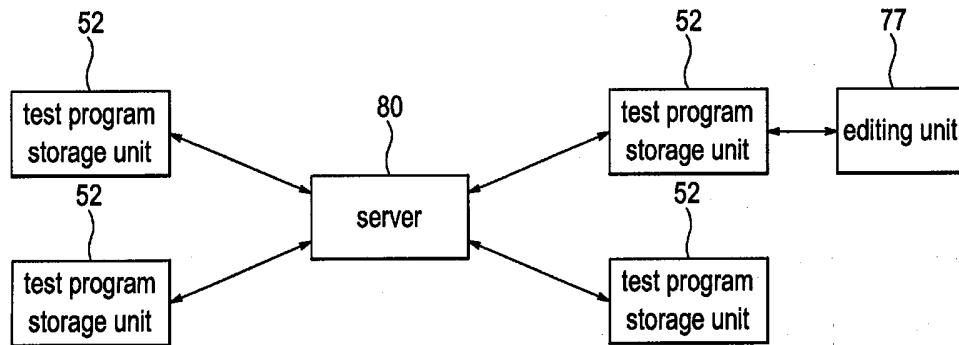
Save

Cancel

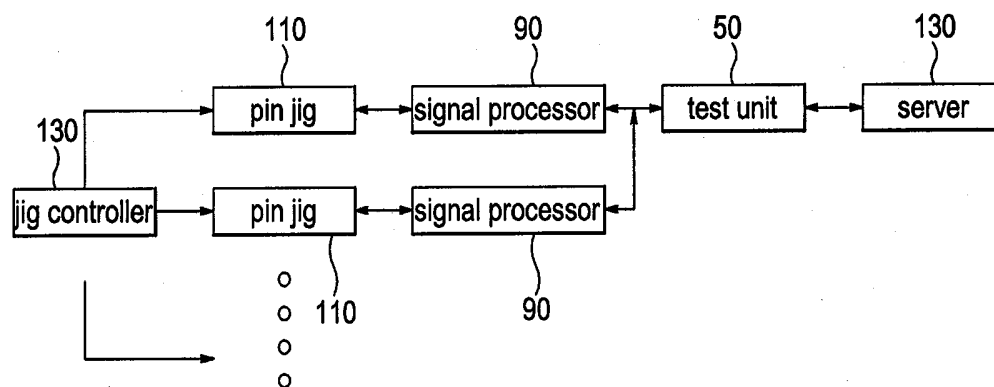
【Figure 10】



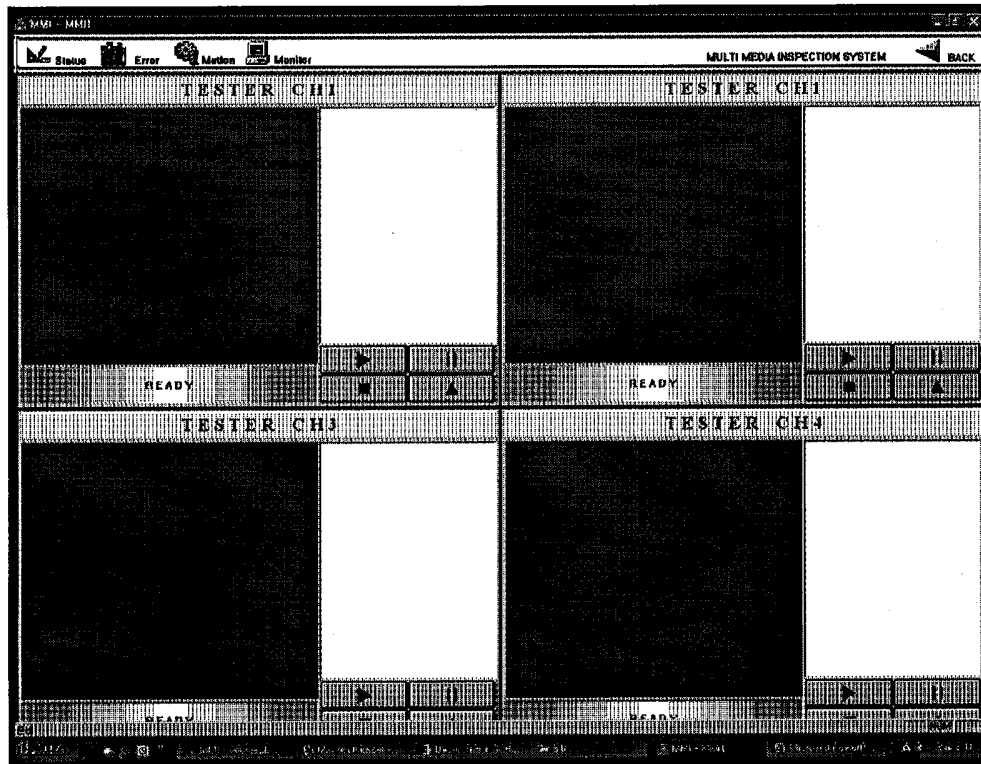
【Figure 11】



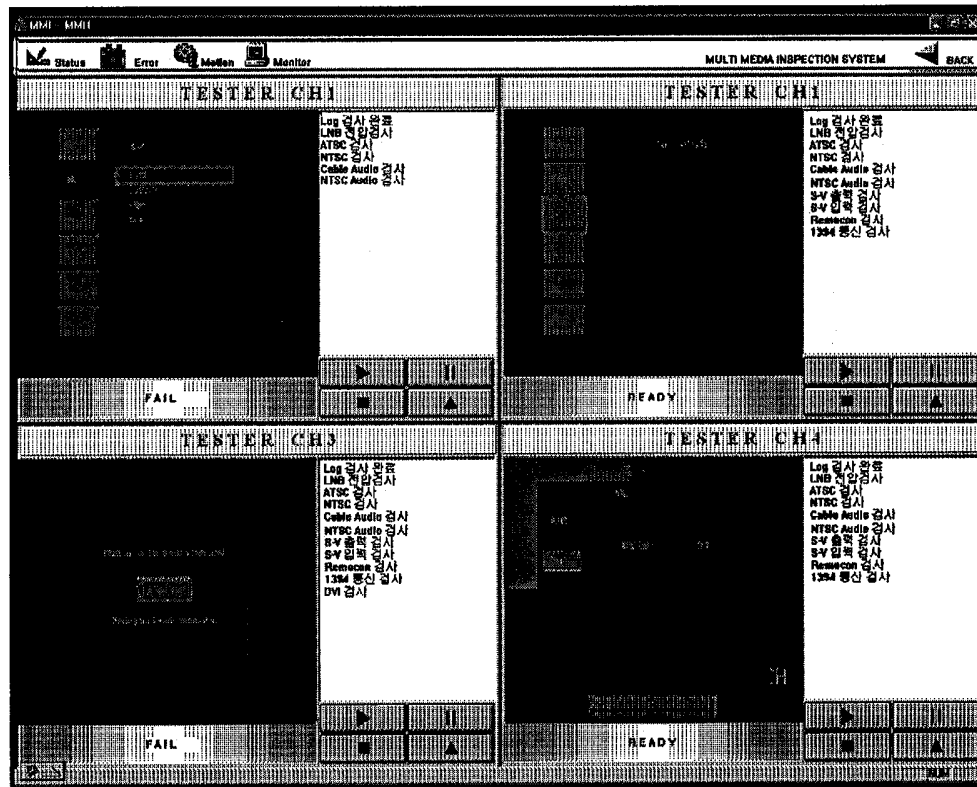
【Figure 12】



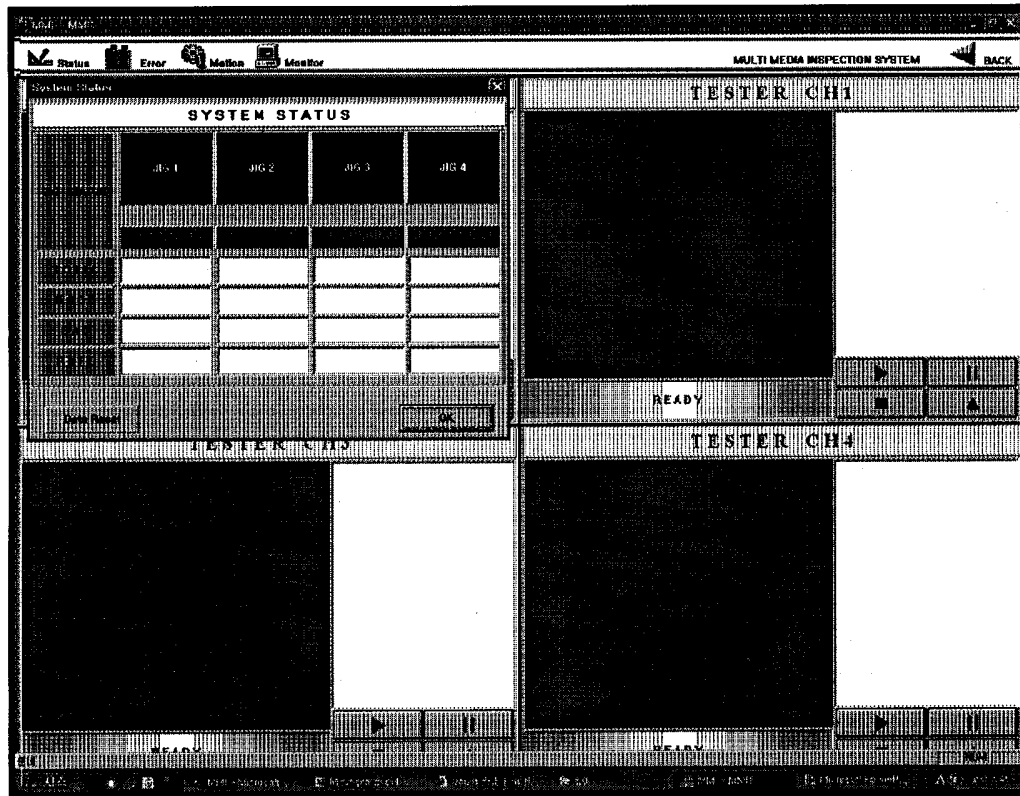
【Figure 13】



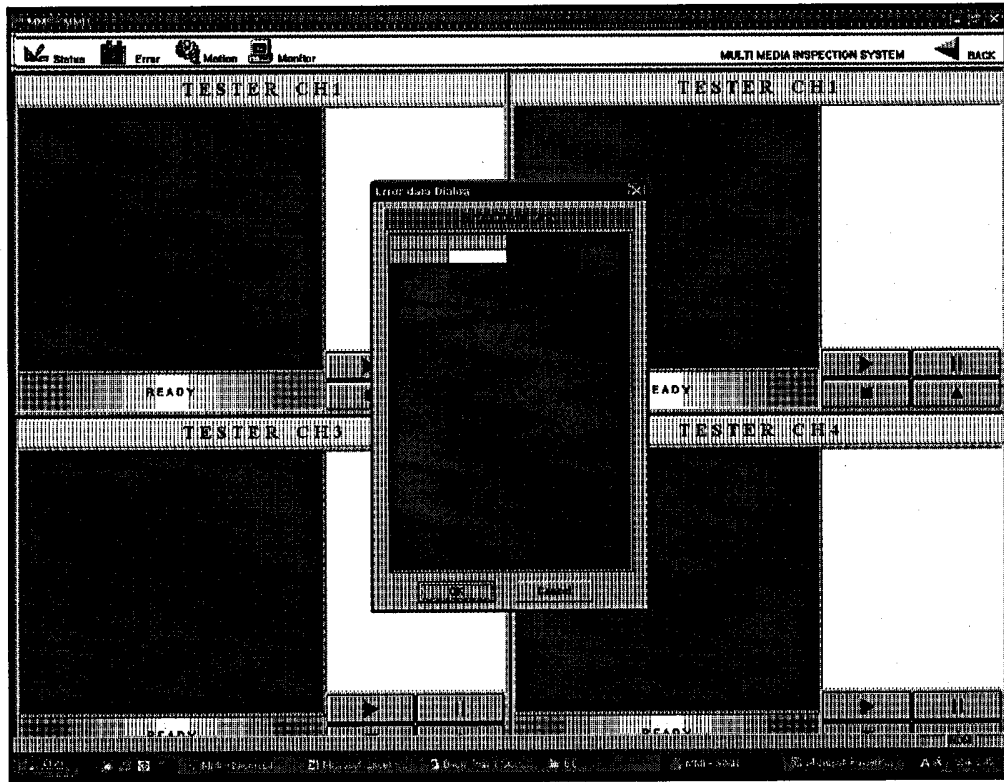
【Figure 14】



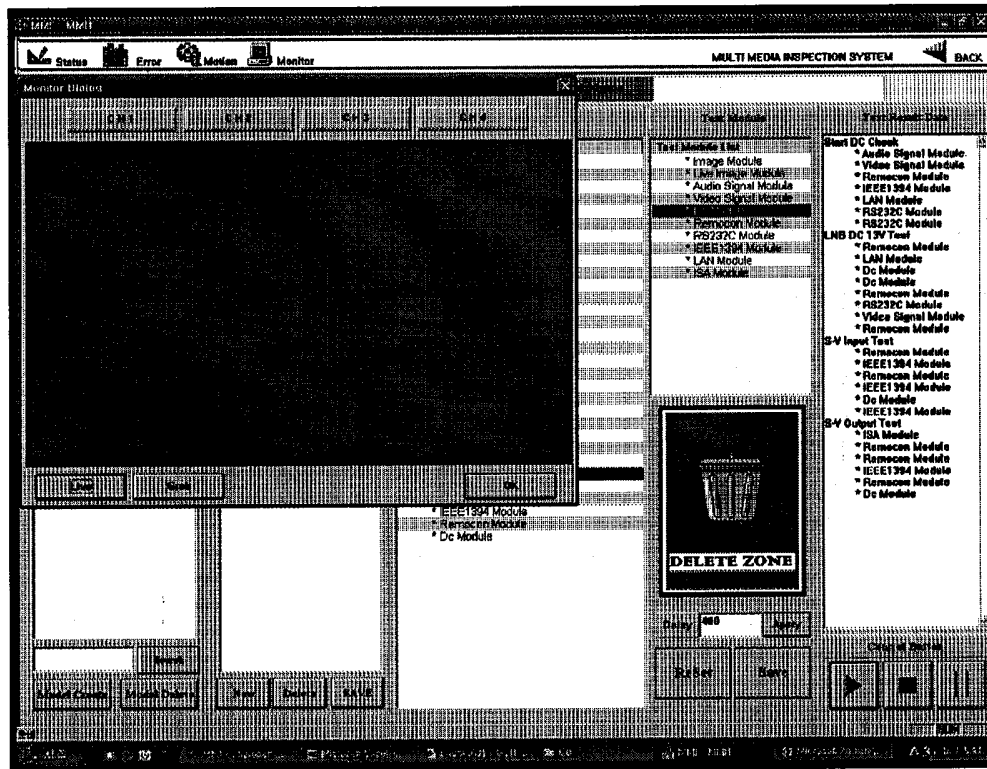
【Figure 15】



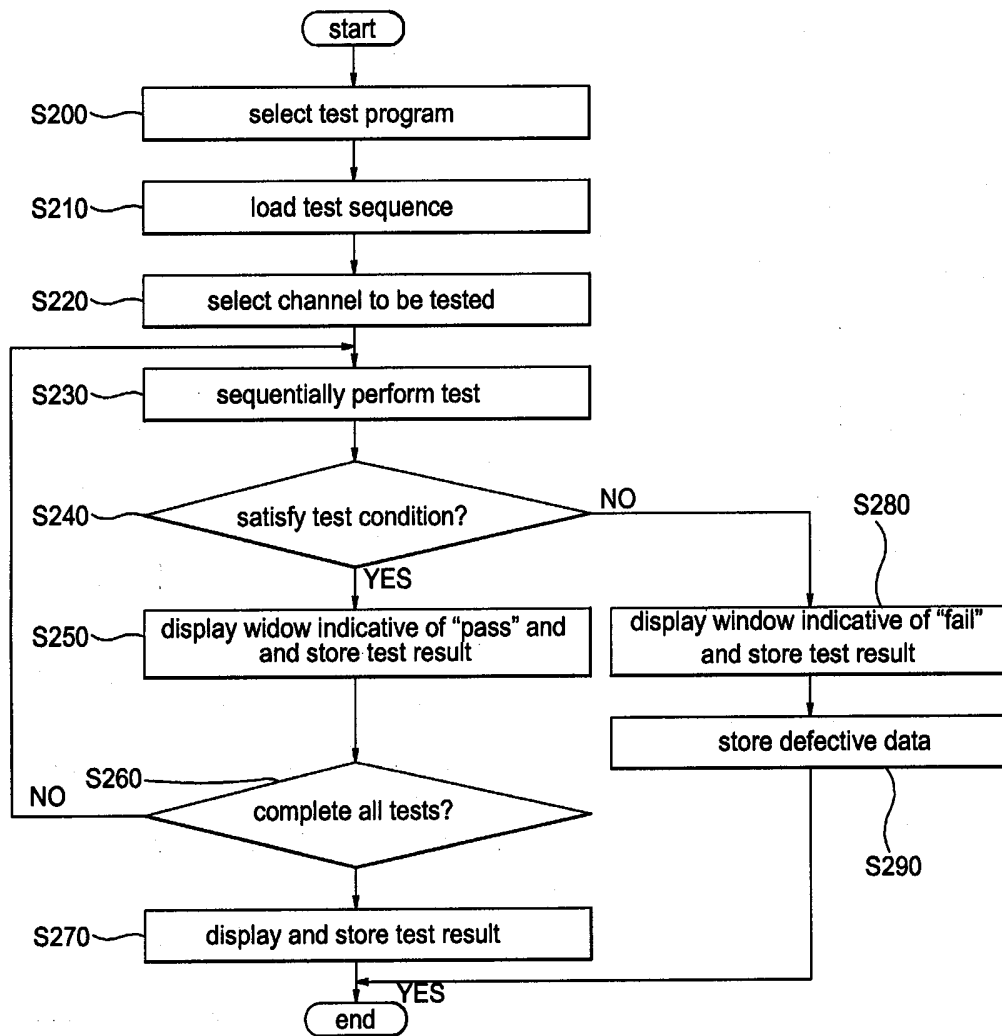
【Figure 16】



【Figure 17】



【Figure 18】



INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2005/000243

A. CLASSIFICATION OF SUBJECT MATTER

IPC7 G06F 19/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

G06F 19/00, G06F 17/60

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean Patents and applications for inventions since 1975

Korean Utility models and applications for Utility models since 1975

Japanese Utility models and application for Utility models since 1975

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKIPASS " INSPECTION, ELECTRONIC DEVICE"

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	KR 2005-7727A (SAMSUNG ELECTRONICS CO., LTD.) 21 JANUARY 2005 SEE PAGE 3-4, FIG. 2, 6	1-17
X	KR 2005-7721A (SAMSUNG ELECTRONICS CO., LTD.) 21 JANUARY 2005 SEE PAGE 3, FIG. 2	1-17
Y	KR 1999-73880 (LG ELECTRONICS INC.) 5 OCTOBER 1999 SEE THE CLAIM	1-17
A	JP 2003-347179 A (HITACHI HIGH TECH CORP) 5 DECEMBER 2003 SEE THE WHOLE DOCUMENT	1-17

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

20 JUNE 2005 (20.06.2005)

Date of mailing of the international search report

20 JUNE 2005 (20.06.2005)

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920 Dunsan-dong, Seo-gu, Daejeon 302-701,
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Facsimile No. 82-42-472-7140

Authorized officer

LEE, Jung Suk

Telephone No. 82-42-481-5789



INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/KR2005/000243

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
KR 2005-7727 A	21/01/2005	NONE	
KR 2005-7721 A	21/01/2005	NONE	
KR 1999-73880 A	05/10/1999	NONE	
JP 2003-347179 A	05/12/2003	EP1367470 A2 US2003226010 A1	03/12/2003 04/12/2003