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(54) ULTRASOUND DIAGNOSTIC SYSTEM AND METHOD FOR AUTOMATICALLY ACTIVATING A PROBE

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(57) **ABSTRACT**

The present invention relates to an ultrasound diagnostic system and a method of automatically activating a probe. The ultrasound diagnostic system comprises: a probe; a sensor mounted on the probe for sensing a user touching the probe and generating a selection signal in response thereto; and a central controller for controlling an activation of the probe based on the selection signal.

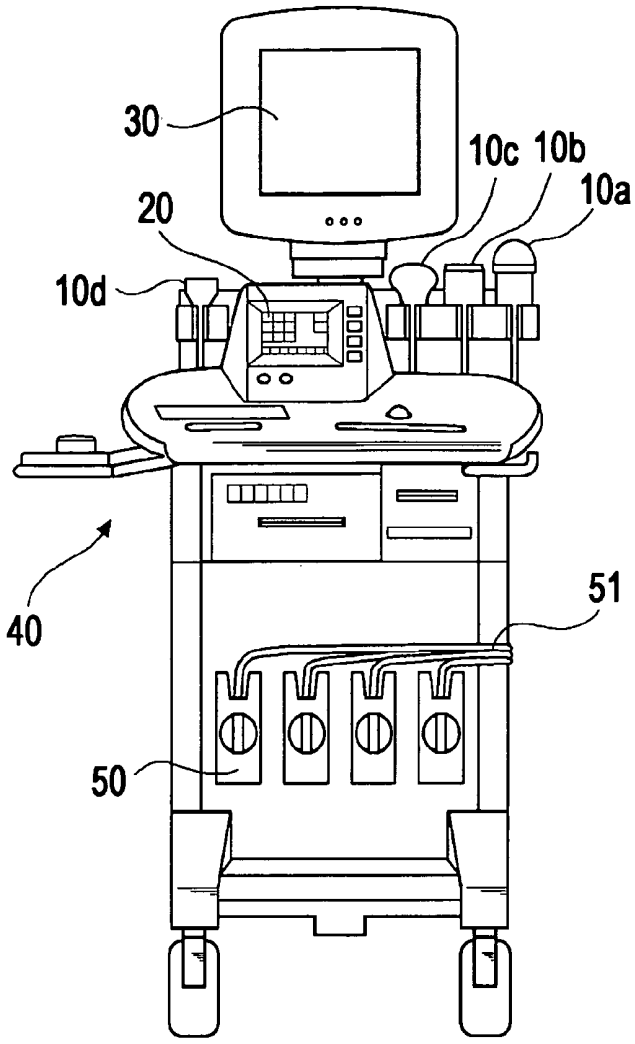


Fig. 1

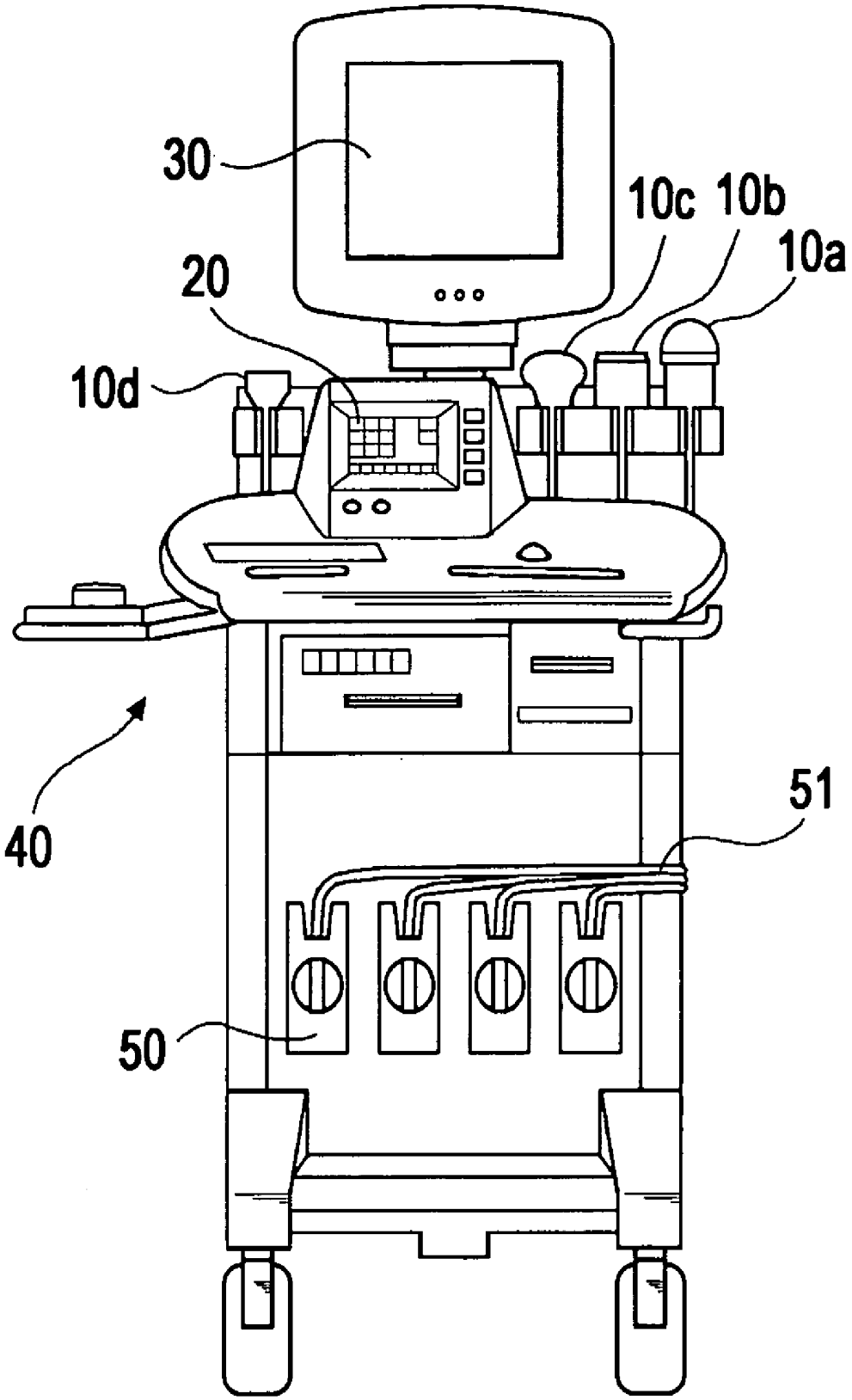


Fig. 2

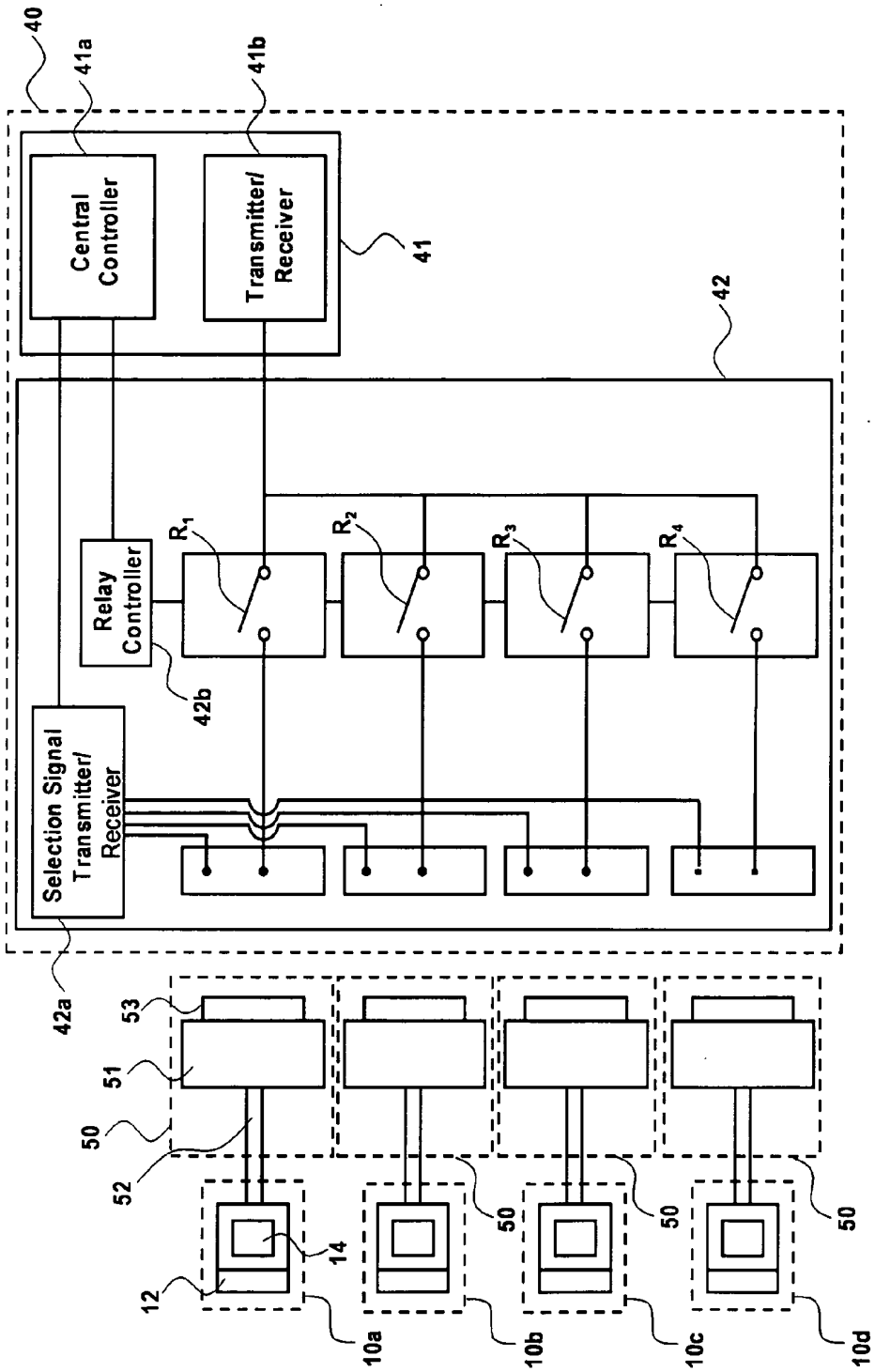
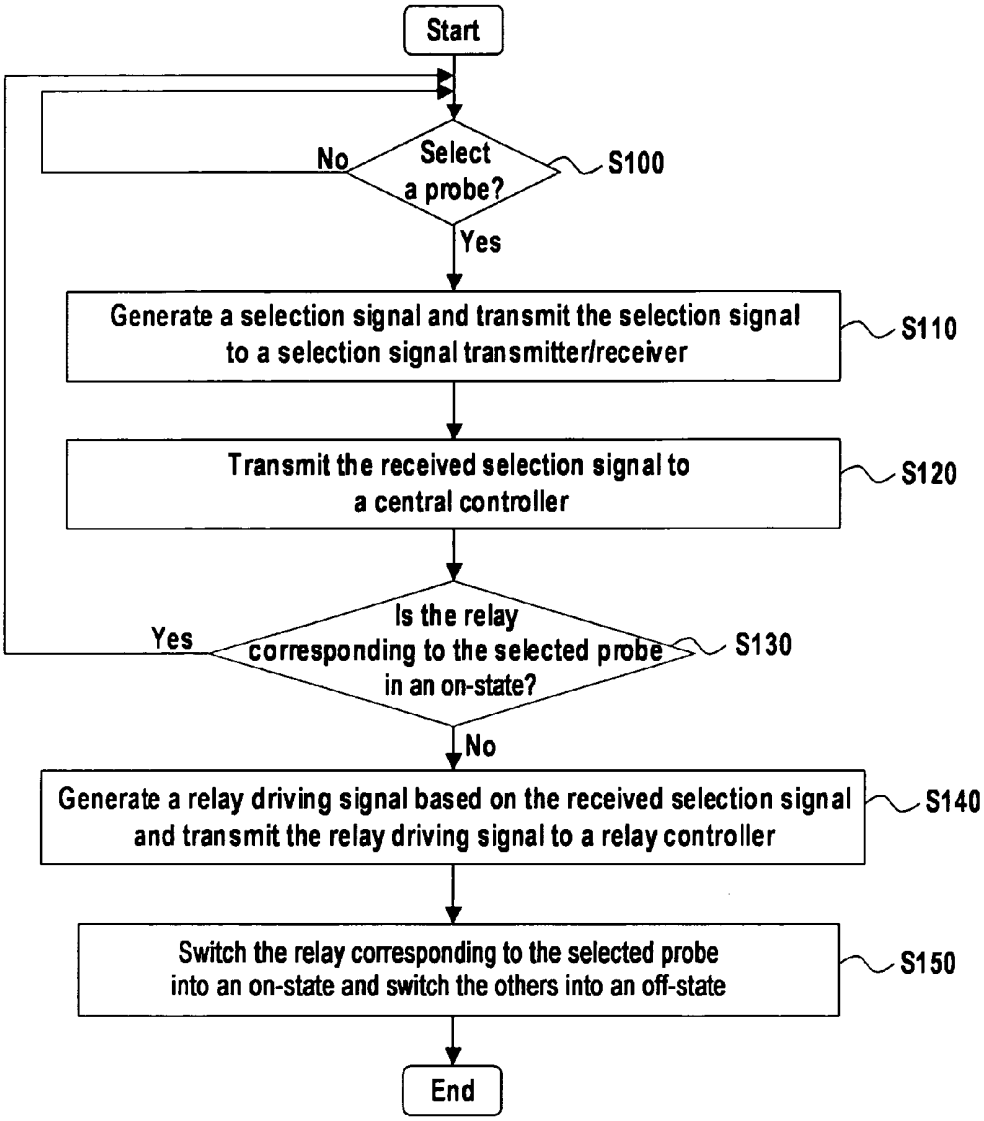

40
41a
41b
Central Controller
Transmitter/ Receiver
41
42
Relay Controller
R_1
R_2
R_3
R_4
42b
Selection Signal Transmitter/ Receiver
42a
53
51
50
52
14
12
10a
10b
10c
10d

Fig. 3


Start
Select a probe?
No
S100
Yes
Generate a selection signal and transmit the selection signal to a selection signal transmitter/receiver
S110
Transmit the received selection signal to a central controller
S120
Is the relay corresponding to the selected probe in an on-state?
Yes
S130
No
Generate a relay driving signal based on the received selection signal and transmit the relay driving signal to a relay controller
S140
Switch the relay corresponding to the selected probe into an on-state and switch the others into an off-state
S150
End

ULTRASOUND DIAGNOSTIC SYSTEM AND METHOD FOR AUTOMATICALLY ACTIVATING A PROBE

FIELD OF THE INVENTION

[0001] The present invention generally relates to an ultrasound diagnostic system, and more particularly to an ultrasound diagnostic system and a method for automatically activating a probe.

BACKGROUND OF THE INVENTION

[0002] An ultrasound diagnostic system generally transmits ultrasound signals to organs and acquires ultrasound images by detecting reflected ultrasound signals from the organs. Particularly, the ultrasound diagnostic system is used to detect foreign materials within a living body, to measure a degree of lesion and to observe, for example, tumors and fetuses.

[0003] A conventional ultrasound diagnostic system comprises a plurality of probes, which transmit ultrasound signals to organs and receive ultrasound echo signals from the organs. It also comprises a user input unit and a display unit. In the conventional ultrasound diagnostic system, when a user selects a particular probe to use among various probes through the user input unit, a central controller within the conventional ultrasound diagnostic system controls an operation of the probe selected by the user. However, the conventional ultrasound system has a problem in that whenever the user selects a probe among various probes, the user must manually input selection information of the probe through the user input unit.

SUMMARY OF THE INVENTION

[0004] It is an objective of the present invention to provide an ultrasound diagnostic system and a method for automatically activating a probe selected by a user through a sensor mounted on the probe.

[0005] In accordance with an aspect of the present invention, there is provided an ultrasound diagnostic system comprising: a probe; a sensor mounted on the probe for sensing a user touching the probe and generating a selection signal in response thereto; and a central controller for controlling an activation of the probe based on the selection signal.

[0006] In accordance with another aspect of the present invention, there is provided an ultrasound diagnostic system comprising: a plurality of probes; a sensor mounted on each of the plurality of probes for sensing a user touching a probe and generating a selection signal in response thereto; a central controller for controlling an activation of the probe based on the selection signal; a plurality of relays connected to each of the plurality of probes; and a relay controller for controlling each of the plurality of relays according to the control of the central controller.

[0007] In accordance with yet another aspect of the present invention, there is provided a method of automatically activating a probe in an ultrasound diagnostic system including a probe, a sensor mounted on the probe and a central controller, comprising the steps of: a) at the sensor, sensing a user touching the probe and generating a selection signal in response thereto; and b) at the central controller, controlling an activation of the probe based on the selection signal.

[0008] In accordance with still yet another aspect of the present invention, there is provided a method of automatically activating a probe in an ultrasound diagnostic system including a plurality of probes, a sensor mounted on each of the plurality of probes, a plurality of relays connected to each of the plurality of probes and a relay controller, comprising the steps of: a) at the sensor, sensing a user touching a probe and generating a selection signal in response thereto; b) at the central controller, generating a control signal based on the selection signal; and c) at the relay controller, switching a relay corresponding to the selected probe into an on-state, and switching the others into an off-state.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] The above and other objects and features of the present invention will become apparent from the following description of preferred embodiments given in conjunction with the accompanying drawings, in which:

[0010] **FIG. 1** is a front view of an ultrasound diagnostic system in accordance with the present invention;

[0011] **FIG. 2** is a schematic diagram showing a plurality of probes, a main board and a probe select assembly board provided within a body in the ultrasound diagnostic system shown in **FIG. 1**; and

[0012] **FIG. 3** is a flowchart illustrating a process of automatically activating a probe in accordance with the present invention.

DETAILED DESCRIPTION OF THE PRESENT INVENTION

[0013] **FIG. 1** is a front view of an ultrasound diagnostic system in accordance with the present invention, and **FIG. 2** is a schematic diagram showing a plurality of probes, a main board and a probe select assembly board provided within a body in the ultrasound diagnostic system shown in **FIG. 1**.

[0014] Referring to **FIGS. 1 and 2**, the ultrasound diagnostic system in accordance with the present invention comprises: a plurality of probes **10***a*, **10***b*, **10***c*, and **10***d*, which transmit ultrasound signals to organs and receive ultrasound echo signals from the organs; a user input unit **20**; a display unit **30**; a body **40**; and a connection unit **50** for connecting the probes **10***a* to **10***d* to body **40**.

[0015] Each probe comprises a transducer **12** having a plurality of ultrasound elements and a sensor **14**. The sensor **14**, which is mounted on each probe **10***a* to **10***d*, senses a user touching a probe and generates a selection signal in response thereto. More particularly, when the user touches probe **10***a* among probes **10***a* to **10***d*, the sensor **14** mounted on the probe **10***a* generates a selection signal. Herein, it is desirable that the sensor **14** can detect the touch of the probe regardless of a position and aspect that the user touches a probe. In the embodiment, a capacitance sensor, a pressure sensor or a temperature sensor can be used as the sensor **14**. Further, the sensor **14** may generate the selection signal

when the user touches the probes **10***a* to **10***d* over a predetermined time, for example, a few seconds.

[**0016**] A body **40** comprises a main board **41** and a Probe Select Assembly (PSA) board **42**. The main board **41** comprises a central controller **41***a* for controlling an activation of the probes and a transmitter/receiver **41***b*. The main board **41** further comprises a beam former (not shown), an image processor (not shown) and a scan converter (not shown). The PSA board **42** comprises: a selection signal transmitter/receiver **42***a* for receiving the selection signal generated from the sensor of the selected probe and transmitting the selection signal to the central controller **41***a* of the main board **41**; relays R_1 to R_4 for connecting each probe **10***a* to **10***d* with transmitter/receiver **41***b*; and a relay controller **42***b* for controlling relays R_1 to R_4 based on a control signal transmitted from the central controller **41***a*. For example, when the user selects the probe **10***a* by various ways such as holding or touching the probe **10***a*, the selection signal transmitter/receiver **42***a* receives the selection signal from the sensor **14** mounted on the probe **10***a* and transmits the selection signal to the central controller **41***a*. The relay controller **42***b* activates the probe **10***a* by switching relay R_1 connected to the probe **10***a* into an on-state, while not activating the probes **10***b* to **10***d* by switching relays R_2 to R_4 connected to the probes **10***b* to **10***d* into an off-state.

[**0017**] In another embodiment of the present invention, the PSA board **42** may not comprise the selection signal transmitter/receiver **42***a*. In such a case, the selection signal transmitted from the sensor **14** is directly transmitted to the central controller **41***a* of the main board **41**.

[**0018**] Each connection unit **50** comprises: a connector **51**; a first connecting cable **52** for connecting the probe with the connector **51**; and a second connecting cable **53** for connecting the connector **51** with the body **40**. The connection unit **50** transmits data between the probes **10***a* to **10***d* and body **40**. The connection unit **50** can be removed when data between the probes **10***a* to **10***d* and body **40** is transmitted via a wireless transmitter/receiver.

[**0019**] Hereinafter, a process for automatically activating a probe in accordance with the present invention will be described by reference of **FIGS. 1-3**.

[**0020**] The sensor **14** mounted on each probe **10***a*-**10***d* senses whether a user selects a probe to use at step S**100**. If it is determined that a probe is not selected, then step S**100** is performed. If it is determined that a probe is selected by the user, then the sensor **14** of the probe **10***a* generates a selection signal and transmits the selection signal to the selection signal transmitter/receiver **42***a* of the PSA board **42** at step S**110**.

[**0021**] The selection signal transmitter/receiver **42***a* transmits the selection signal to the central controller **41***a* of the main board **41** at step S**120**.

[**0022**] The central controller **41***a* determines whether a relay corresponding to the selected probe is in an on-state at step S**130**. If it is determined that the relay is in an on-state, then step S**100** is performed to receive a selection of a probe. If it is determined that the relay is in an off-state, central controller **41***a* generates a relay driving signal which switches the relay corresponding to the selected probe into an on-state, the others into an off-state, based on the received selection signal, and transmits the relay driving signal to the relay controller **42***a* at step S**140**.

[**0023**] The relay controller **42***a* switches the relay corresponding to the selected probe to on-state, switches the others to off-state, based on the relay driving signal transmitted from the central controller **41***a* at step S**150**.

[**0024**] In another embodiment, two or more sensors may generate the selection signals and transmit the selection signals to the central controller **41***a* during a predetermined time. In such a case, the central controller **41***a* may display an alarm message for informing that a plurality of probes are selected and wait to select one probe. The alarm message may be sound or voice message. In another embodiment, the central controller **41***a*, which receives the selection signals during a predetermined time, may decide to choose a selection signal among the selection signals based on predetermined superiority, and perform step S**140** and step S**150** based on the decided selection signal.

[**0025**] As mentioned above, the present invention provides an effect in which a probe can be automatically activated so that a user does not need to input information for selecting a probe through the user input unit. Therefore, convenience can be provided to the user.

[**0026**] While the present invention has been described and illustrated with respect to a preferred embodiment of the invention, it will be apparent to those skilled in the art that variations and modifications are possible without deviating from the broad principles and teachings of the present invention which should be limited solely by the scope of the claims appended hereto.

What is claimed is:

1. An ultrasound diagnostic system, comprising:

a probe;

a sensor mounted on the probe for sensing a user touching the probe and generating a selection signal in response thereto; and

a central controller for controlling an activation of the probe based on the selection signal.

2. The ultrasound diagnostic system as recited in claim 1, wherein the sensor is a capacitance sensor, a pressure sensor or a temperature sensor.

3. The ultrasound diagnostic system as recited in claim 1, wherein the ultrasound diagnostic system further comprises a selection signal transmitting/receiving means for receiving the selection signal from the sensor and transmitting the selection signal to the central controller.

4. An ultrasound diagnostic system, comprising:

a plurality of probes;

a sensor mounted on each of the plurality of probes for sensing a user touching a probe and generating a selection signal in response thereto;

a central controller for controlling an activation of the probe based on the selection signal;

a plurality of relays connected to each of the plurality of probes; and

a relay controller for controlling each of the plurality of relays according to the control of the central controller.

5. The ultrasound diagnostic system as recited in claim 4, wherein the sensor is a capacitance sensor, a pressure sensor or a temperature sensor.

6. The ultrasound diagnostic system as recited in claim 4, wherein the ultrasound diagnostic system further comprises a selection signal transmitting/receiving means for receiving the selection signal from the sensor and transmitting the selection signal to the central controller.

7. A method of automatically activating a probe in an ultrasound diagnostic system including a probe, a sensor mounted on the probe, and a central controller, comprising the steps of:

a) at the sensor, sensing a user touching the probe and generating a selection signal in response thereto; and

b) at the central controller, controlling an activation of the probe based on the selection signal.

8. A method of automatically activating a probe in an ultrasound diagnostic system including a plurality of probes, a sensor mounted on each of the plurality of probes, a plurality of relays connected to each of the plurality of probes, and a relay controller, comprising the steps of:

a) at the sensor, sensing a user touching a probe and generating a selection signal in response thereto;

b) at the central controller, generating a control signal based on the selection signal; and

c) at the relay controller, switching a relay corresponding to the selected probe to on-state, and switching the others to off-state.

* * * * *

专利名称(译)	超声诊断系统和用于自动激活探针的方法		
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当前申请(专利权)人(译)	MEDISON CO.，LTD.		
[标]发明人	LEE TAE HO		
发明人	LEE, TAE HO		
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外部链接	Espacenet USPTO		

摘要(译)

超声诊断系统和自动激活探针的方法技术领域超声诊断系统包括：探针;安装在探头上的传感器，用于检测用户触摸探头并响应于此产生选择信号;以及中央控制器，用于根据选择信号控制探针的激活。