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(54) **SYSTEM AND METHOD FOR PROVIDING A USER INTERFACE FOR AN ULTRASOUND SYSTEM**

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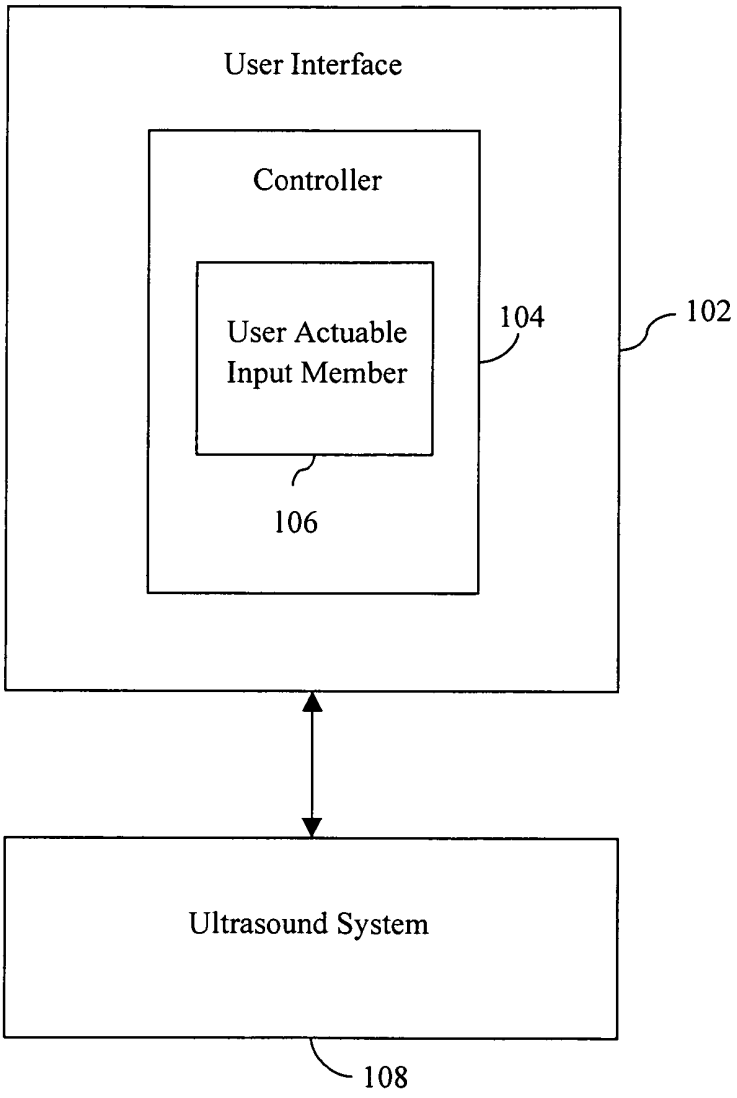
(57) **ABSTRACT**

A user interface for an ultrasound system is provided. The ultrasound system includes an ultrasound probe. The user interface includes at least one user actuable input member for controlling operation of an ultrasound system. The at least one user actuable input member is user configurable to control at least one operation of the ultrasound system. The user interface also has a controller including the at least one user actuable input member. The controller is removably attachable to the ultrasound probe.



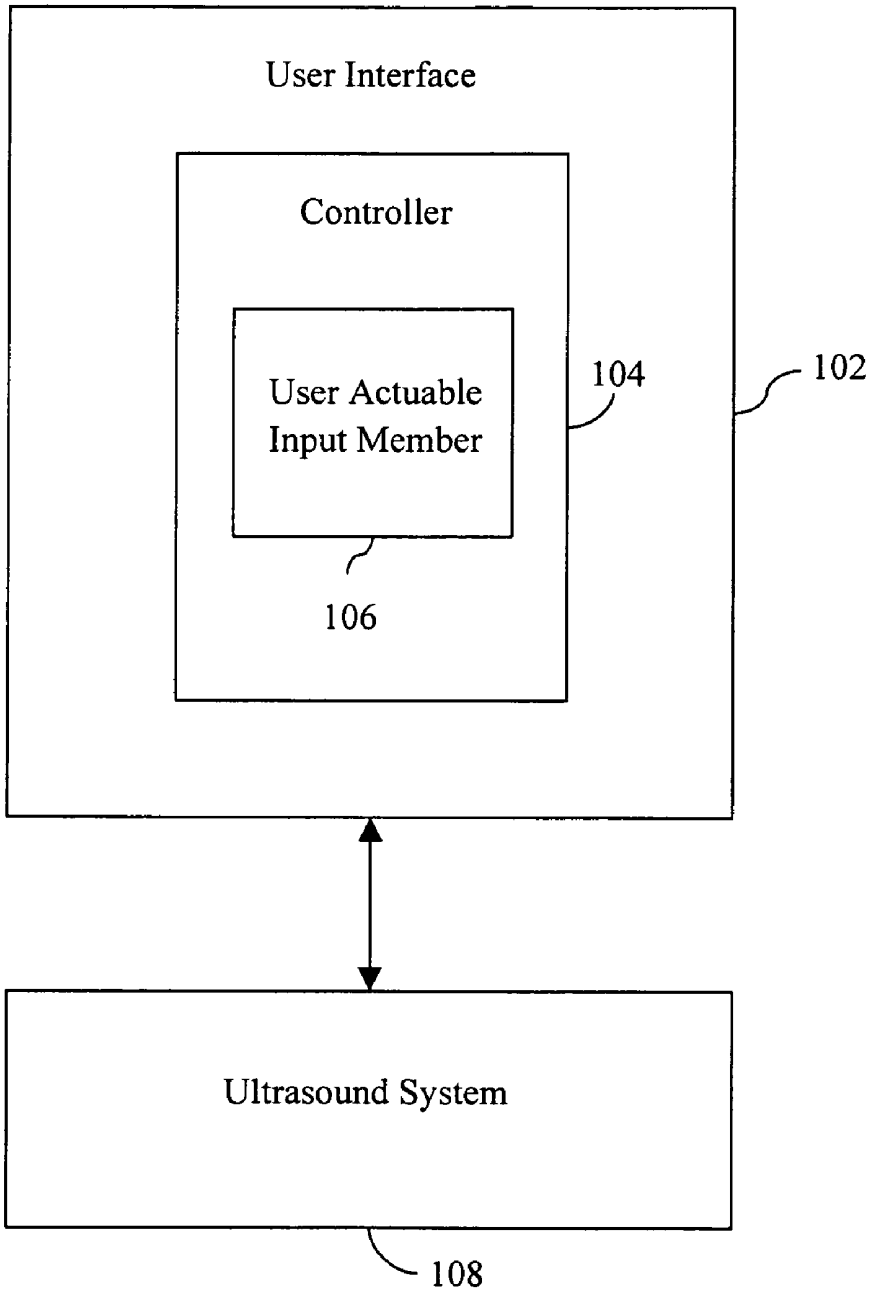

User Interface
Controller
User Actuable Input Member
104
102
106
Ultrasound System
108

FIG. 1

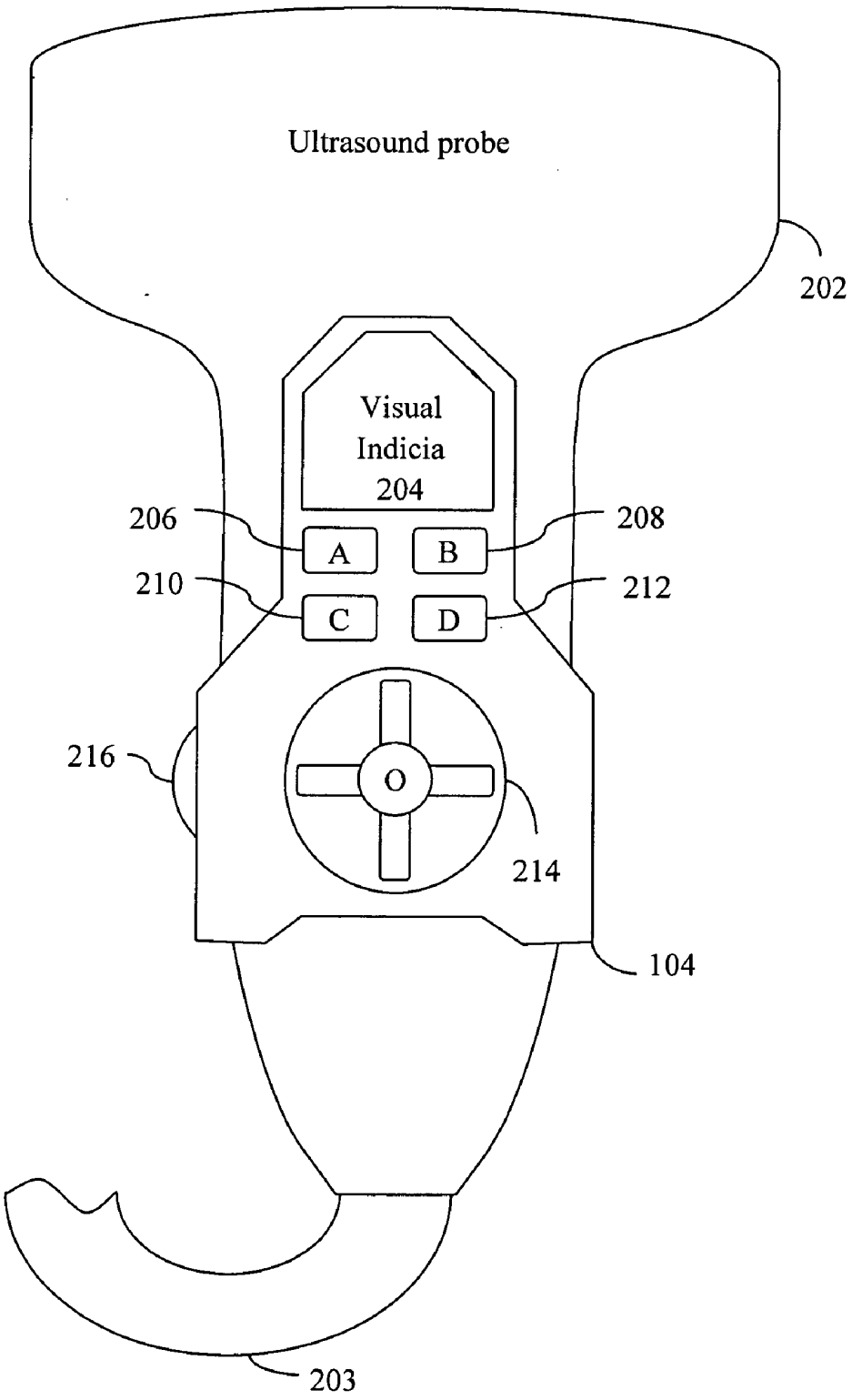

Ultrasound probe
202
Visual
Indicia
204
206
208
A
B
210
212
C
D
216
O
214
104
203

FIG. 2

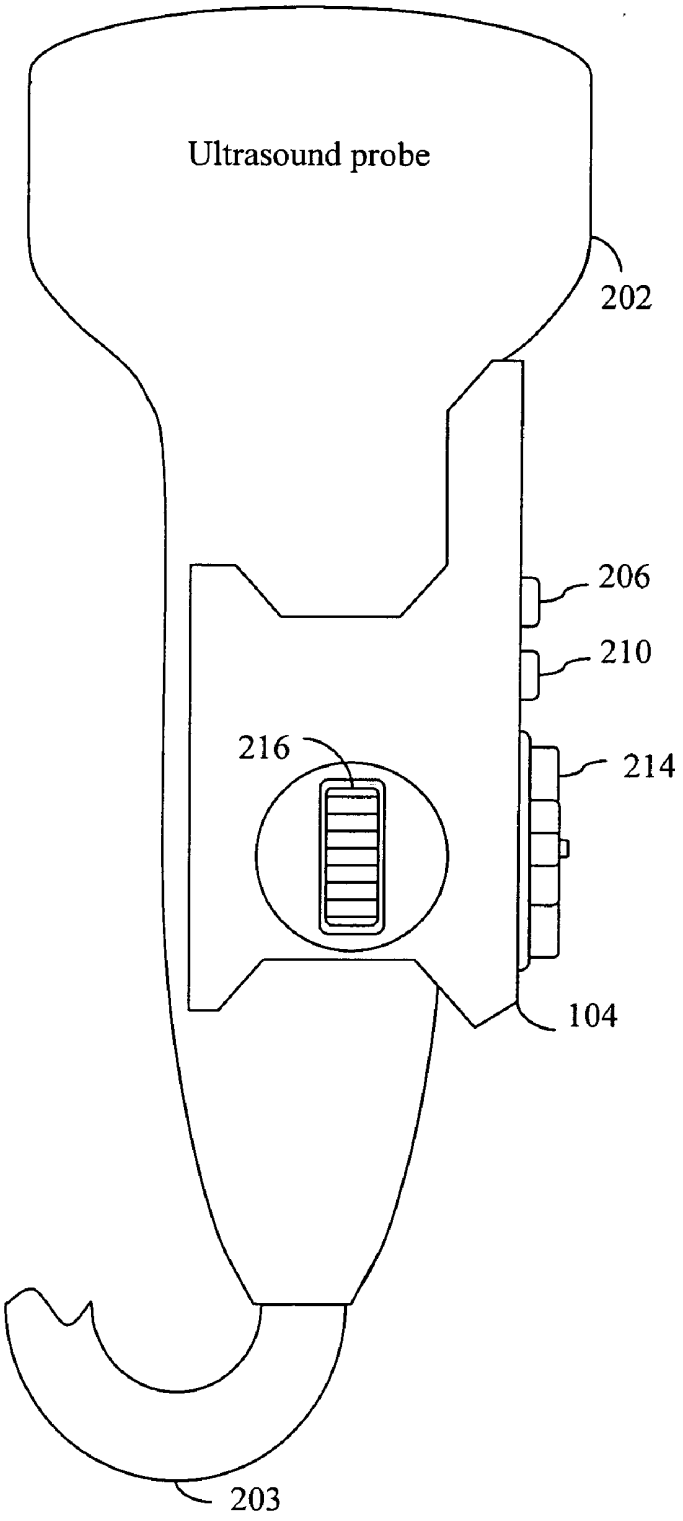


FIG. 3

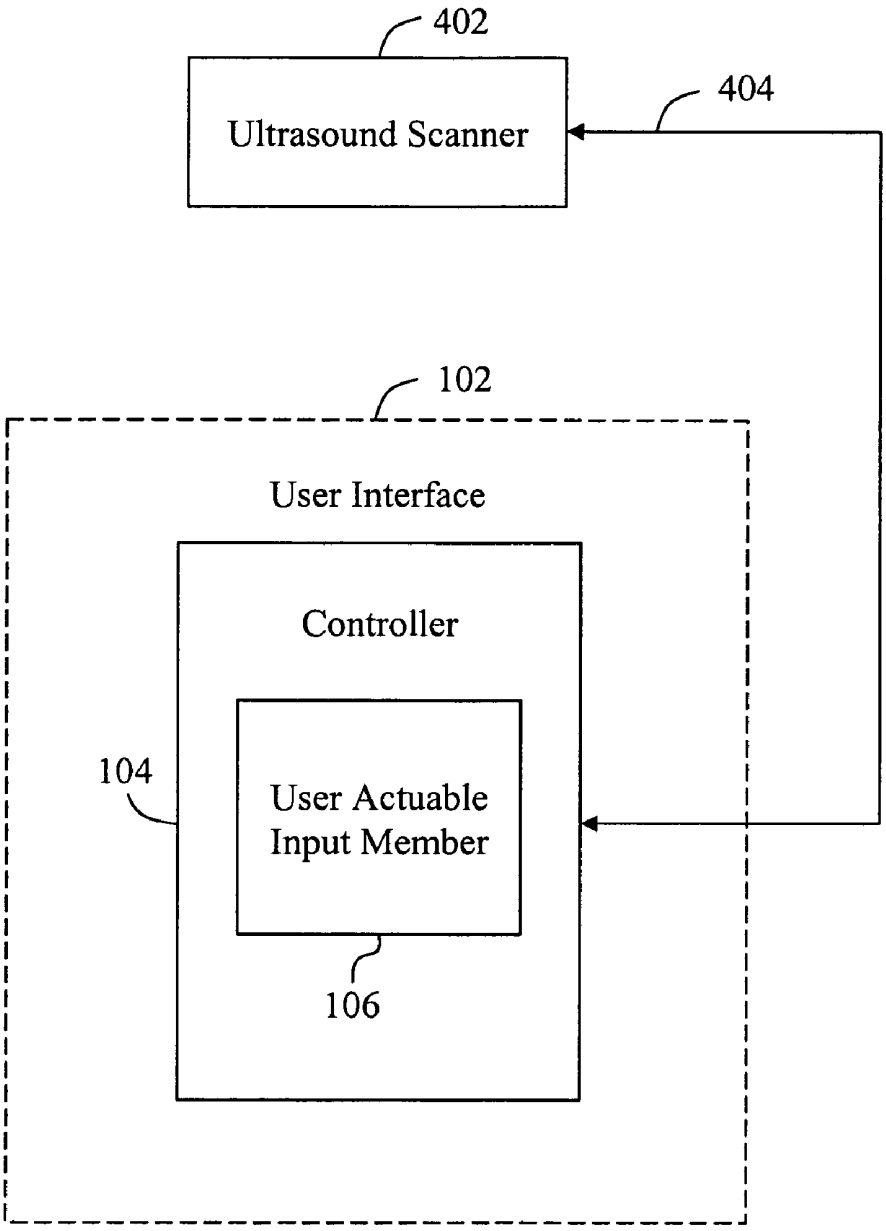

402
Ultrasound Scanner
404
102
User Interface
Controller
104
User Actuable
Input Member
106

FIG. 4

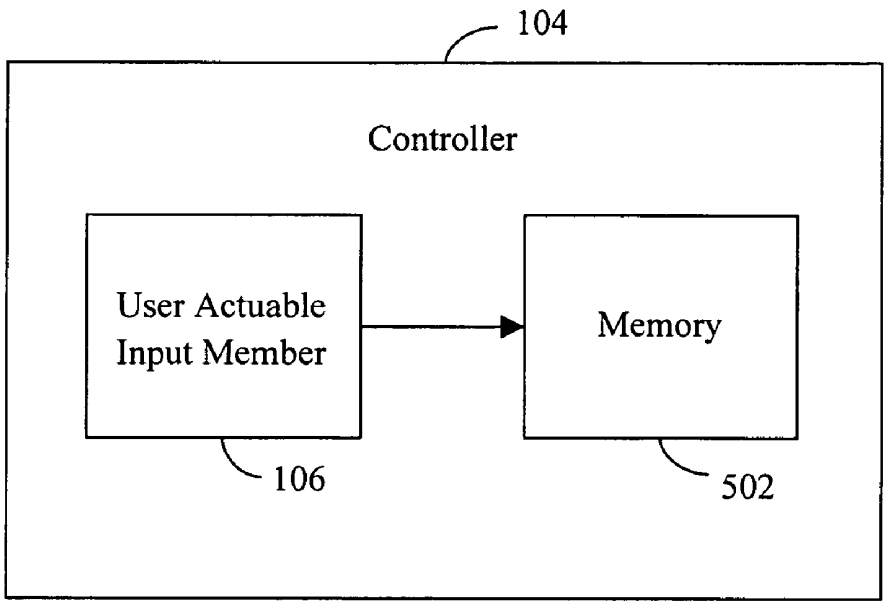


FIG. 5

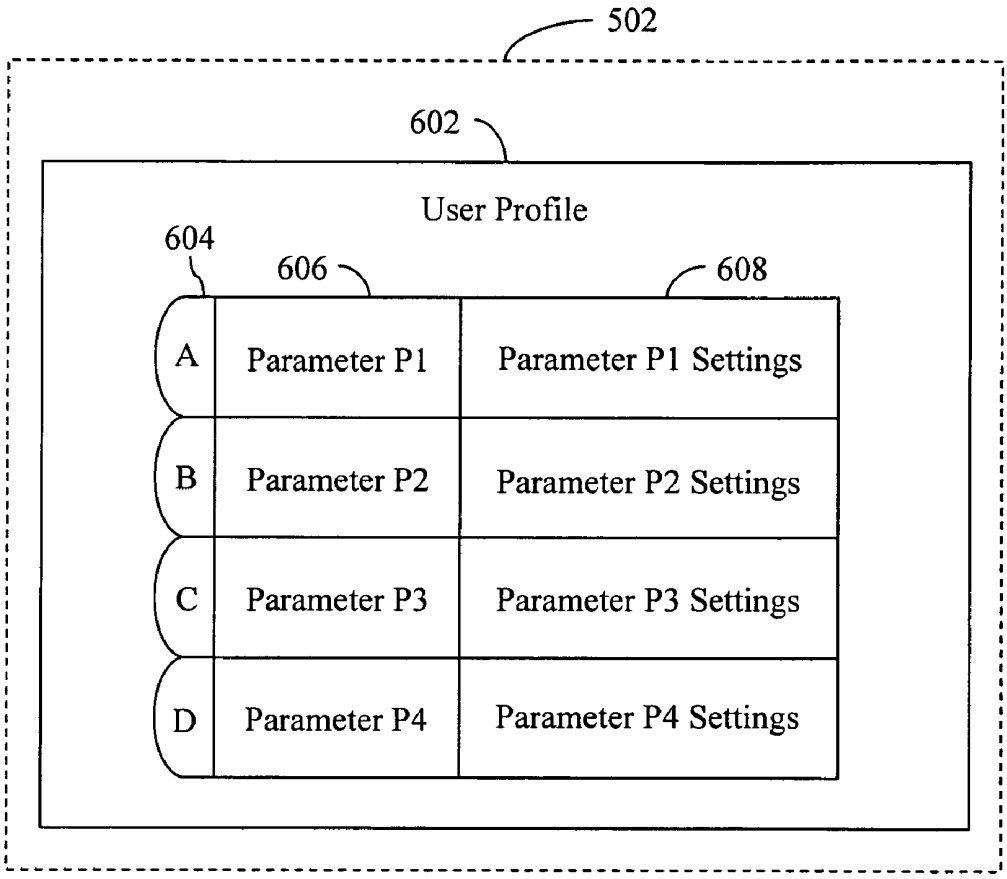

502
602
User Profile
604
606
608
A
Parameter P1
Parameter P1 Settings
B
Parameter P2
Parameter P2 Settings
C
Parameter P3
Parameter P3 Settings
D
Parameter P4
Parameter P4 Settings

FIG. 6

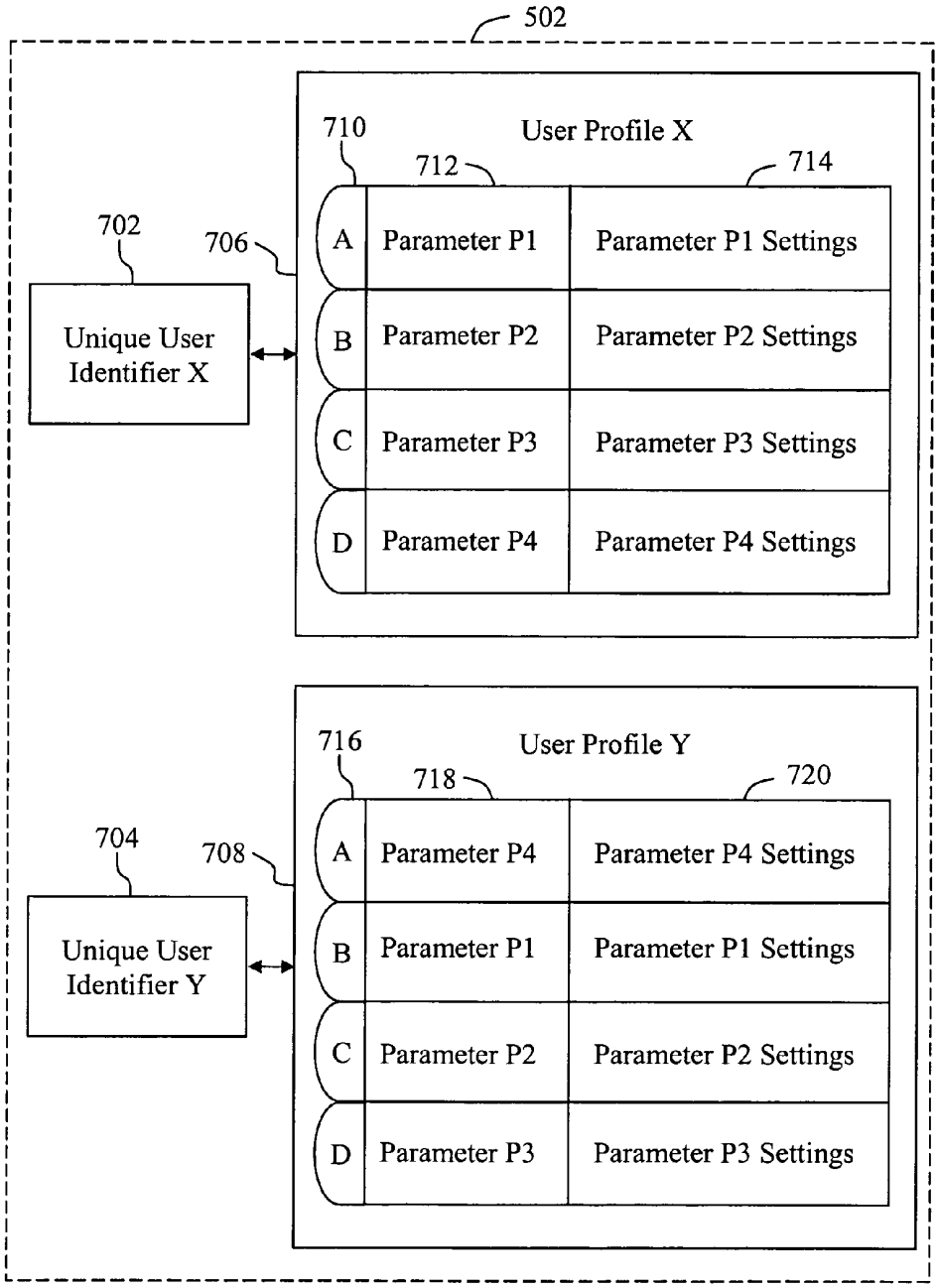

502
710
User Profile X
712
714
702
706
Unique User Identifier X
A
Parameter P1
Parameter P1 Settings
B
Parameter P2
Parameter P2 Settings
C
Parameter P3
Parameter P3 Settings
D
Parameter P4
Parameter P4 Settings
716
User Profile Y
718
720
704
708
Unique User Identifier Y
A
Parameter P4
Parameter P4 Settings
B
Parameter P1
Parameter P1 Settings
C
Parameter P2
Parameter P2 Settings
D
Parameter P3
Parameter P3 Settings

FIG. 7

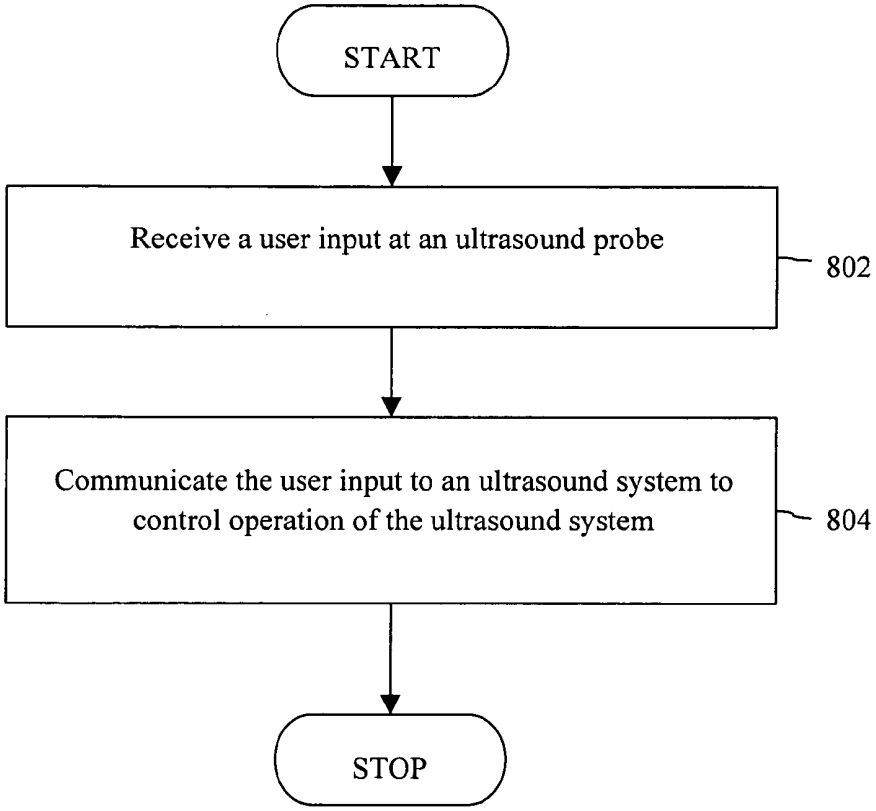

START
Receive a user input at an ultrasound probe
802
Communicate the user input to an ultrasound system to control operation of the ultrasound system
804
STOP

FIG. 8

SYSTEM AND METHOD FOR PROVIDING A USER INTERFACE FOR AN ULTRASOUND SYSTEM

BACKGROUND OF THE INVENTION

[0001] The invention relates generally to ultrasound systems, and more particularly, to user interfaces for ultrasound systems.

[0002] Medical ultrasound systems may be used to examine and study, for example, anatomical structures, detect anomalies in tissues and measure blood flow within the body. Ultrasound systems typically include an ultrasound probe that is used to transmit pulses of ultrasound waves, known as imaging pulses, into the body. Acoustic echo signals are generated at interfaces in the body in response to these waves. These echo signals are received by the ultrasound probe and transformed into an electrical signal that is used to produce an image of the body part under examination. This image is displayed on a display device.

[0003] In typical ultrasound systems, while performing a scan, users typically have to go back and forth to an ultrasound scanner to adjust or control the change of a parameter of the ultrasound probe or the ultrasound system. These adjustments or control changes include, for example, gain adjustment, freezing frames for printing, transmitted-wave amplitude modification, and modification of other control parameters used to obtain an optimal setting for the diagnostic image. These ultrasound systems, however, provide limited flexibility and user-friendliness. The user normally has to look at the ultrasound image display unit and, at the same time, manipulate control parameters from the ultrasound scanner. This procedure makes it difficult for the user to efficiently scan and obtain ultrasound images. For example, when a desired frame is seen on the display that needs to be captured and printed, the user needs to freeze it from the ultrasound scanner. While doing so, there is lost scan time and the ultrasound probe also may get disturbed because of the user's movements, causing undesirable results. Further, typical ultrasound systems are not able to provide adequate flexibility when the user must use both hands. An example of such a case is when a user uses one hand for the probe, and the other to manipulate the scanning anatomy or perform interventional procedures. An example of patient manipulation is applying and removing pressure to stimulate venous flow. Interventional procedures include biopsies or therapeutic seed implants.

[0004] Further, ultrasound systems in a multi-user environment do not provide an easy and practical way to have each user settings programmed on each ultrasound system. For example, a user in a hospital with many ultrasound systems typically must adjust control settings and parameters on each ultrasound system before and during an ultrasound scan. Any changes to settings are stored on the current ultrasound system and cannot be easily transferred to another ultrasound system.

[0005] Thus, known ultrasound systems and methods for providing ultrasound imaging provide limited flexibility and user-friendliness.

BRIEF DESCRIPTION OF THE INVENTION

[0006] In one exemplary embodiment, a user interface for an ultrasound system is provided. The ultrasound system includes an ultrasound probe. The user interface includes at least one user actuable input member for controlling operation of the ultrasound system. The at least one user actuable input member is user configurable to control at least one operation of the ultrasound system. The user interface also has a controller including the at least one user actuable input member. The controller is removably attachable to the ultrasound probe.

[0007] In another exemplary embodiment, a controller for an ultrasound system having an ultrasound probe is provided. The controller includes means for receiving at least one user input for controlling the ultrasound system. The controller also includes means for removably attaching the means for receiving to the ultrasound probe. The controller further includes means for communicating the at least one received user input to the ultrasound system for controlling the ultrasound system.

[0008] In yet another exemplary embodiment, a method for controlling an ultrasound system having an ultrasound probe is provided. The method includes receiving user inputs at an ultrasound probe. The user inputs correspond to control functions for controlling the ultrasound system and are configurable by a user. The method further includes communicating the user input to ultrasound system to control operation of the ultrasound system.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] **FIG. 1** is a block diagram of a user interface for an ultrasound system in accordance with an exemplary embodiment of the invention.

[0010] **FIG. 2** is a top plan view of a user interface attached to an ultrasound probe in accordance with an exemplary embodiment of the invention.

[0011] **FIG. 3** is a side elevation view of a user interface attached to an ultrasound probe in accordance with an exemplary embodiment of the invention.

[0012] **FIG. 4** is a block diagram illustrating communication between a user interface and an ultrasound scanner connected to an ultrasound probe in accordance with an exemplary embodiment of the invention.

[0013] **FIG. 5** is a block diagram of a controller in accordance with an exemplary embodiment of the invention.

[0014] **FIG. 6** is a block diagram illustrating a user configuration stored in a memory in accordance with an exemplary embodiment of the invention.

[0015] **FIG. 7** is a block diagram illustrating a set of user identifiers and associated user configurations stored in a memory in accordance with an exemplary embodiment of the invention.

[0016] **FIG. 8** is a flowchart illustrating a method to control an ultrasound system in accordance with an exemplary embodiment of the invention.

DETAILED DESCRIPTION OF THE INVENTION

[0017] Various embodiments of the invention provide a user interface and method for controlling an ultrasound system having an ultrasound probe. The user interface is operable at an ultrasound probe and the operations of the

ultrasound probe or the ultrasound system may be controlled through the user interface attached to the ultrasound probe.

[0018] **FIG. 1** is a block diagram of a user interface **102** for an ultrasound system in accordance with an exemplary embodiment of the invention. User interface **102** includes a controller **104** and at least one user actuable input member **106**. User interface **102** is connected to an ultrasound system **108** via a wireless or wired connection. In one embodiment, the ultrasound system **108** includes an ultrasound probe (not shown). Controller **104** controls operations of ultrasound system **108**. The control of operations of ultrasound system **108** by controller **104** is described in detail in connection with **FIG. 8**. User actuable input member **106** is provided as part of controller **104** (e.g., integrated therewith), and more than one user actuable input member **106** may be provided as part controller **104** as desired or needed. User actuable input member **106** may be, for example, a button, switch, knob, dial, wheel, touch pad, joystick and slide, among others.

[0019] In an exemplary embodiment of the invention, the operations of ultrasound system **108** and ultrasound probe **202** (shown in **FIG. 2**), which may be connected to ultrasound system **108**, may be controlled by user interface **102** and include, for example, image capture operations, such as freeze, print, and cine-loop, scanning mode controls, such as switching between 2D imaging and Doppler or M-mode in a duplex display, acquisition trigger controls, such as extended field of view or 3D acquisition, trigger, image optimization controls, such as automatic image optimization, user presets, frequency, application, gain, dynamic range, edge enhance, depth, display depth, transmit focus controls, among others.

[0020] In one exemplary embodiment of the invention, ultrasound system is an ultrasound scanner. In this embodiment, user actuable input member **106** controls at least one scanning operation of the ultrasound scanner. In another embodiment, user actuable input member **106** controls at least one non-scanning operation of the ultrasound scanner. Examples of non-scanning operations of ultrasound system **108** include identification and authentication of a user. In an exemplary embodiment of the invention, for example, a user may be identified and authenticated by a login id and a password.

[0021] **FIG. 2** is a top plan view of user interface **102** attached to an ultrasound probe in accordance with an exemplary embodiment of the invention. **FIG. 3** is a side elevation view of user interface **102** attached to the ultrasound probe in accordance with an embodiment of the invention. User interface **102** is removably attachable to ultrasound probe **202**.

[0022] In various embodiments, body of controller **104** includes arms configured to extend around a portion of ultrasound probe **202** to removably attach user interface **102** to ultrasound probe **202**. Body of controller **104** includes a top surface with an extension, which in one embodiment includes at least one user actuable input member **106** provided as a part of the extension. In another embodiment, controller **104** has a C like shape to attach to ultrasound probe **202**. User actuable input member **106** is reconfigurable, for example, to control operation of ultrasound probe **202** or ultrasound system **108**, and operable using user actuable input member **106**, which can be reconfigured and changed. The reconfiguration of user actuable input member **106** is described in detail in connection with **FIG. 7**.

[0023] Ultrasound probe **202** includes a cable **203**. Cable **203** connects ultrasound probe **202** to ultrasound system **108**, for example an ultrasound scanner (not shown in **FIG. 2**). Controller **104** includes, for example, user actuable input members **206**, **208**, **210**, **212**, **214** and **216**, and a visual indicia **204**. In this embodiment, user actuable input members **206**, **208**, **210** and **212** are buttons that are pressed to actuate an operation of ultrasound probe **202** or ultrasound system **108**. User actuable input member **214** is a rocker type switch that is used to actuate another operation of ultrasound system **108** or ultrasound probe **202** and modify it simultaneously. For example, user actuable input member **214** may be used to actuate a gain adjustment operation and then increase and decrease the gain. User actuable input member **216** in this embodiment is a scroll wheel that can be turned to actuate and, at the same time, make adjustments to an operation of ultrasound system **108** or ultrasound probe **202**. User actuable input member **216** is positioned, for example, on a right side of controller **104** to facilitate a right-handed user to turn user actuable input member **216** using the thumb. In another embodiment, user actuable input member **216** is positioned on a left side of controller **104** to facilitate a left-handed user. Controller **104** is configured to provide visual indicia **204** to associate controller **104** with a user (e.g., user name or ID number).

[0024] In another embodiment, a scroll wheel may be provided on the upper surface of controller **104**. Controller **104** may include other or different types of user actuable input members to provide a control of different operators as desired or needed.

[0025] To control the operation of ultrasound system **108** or ultrasound probe **202**, controller **104** communicates with ultrasound system **108**, for example, an ultrasound scanner. In an exemplary embodiment of the invention, ultrasound system **108** is an ultrasound scanner. **FIG. 4** is a block diagram illustrating the communication between a controller and an ultrasound scanner connected to ultrasound probe **202** in accordance with an exemplary embodiment of the invention. An ultrasound scanner **402** is connected to controller **104** through a communication link **404**. Communication link **404** is one of a wireless and wired connection. In one embodiment, controller **104** is configured to wirelessly communicate with ultrasound scanner **402** through communication link **404**. Wireless communication between controller **104** and ultrasound scanner **402** may be provided, for example, using one of Bluetooth, RF, radio signals, wireless LANs, wireless networks, and infra red. In this embodiment, wireless transceivers (not shown) are provided in controller **104** and ultrasound scanner **402** to enable wireless communication as is known. In another embodiment, controller **104** is configured to communicate with ultrasound scanner **402** through a wired connection provided by communication link **404**. The wired connection may be a wire separate from cable **203** that connects ultrasound probe **202** with ultrasound scanner **402**. In another embodiment, cable **203** is used for communication between controller **104** and ultrasound scanner **402**. Where communication is enabled with a cable separate from cable **203**, the separate cable is clipped on or mounted onto cable **203**. This facilitates the handling of the ultrasound probe with still one cable to maneuver for the user.

[0026] Once communication between controller **104** and ultrasound scanner **402** is established, user adjustable parameters, actuated by a user to control the operation of ultrasound probe **202** or ultrasound scanner **402** are communicated to ultrasound scanner **402** from controller **104**. Ultrasound scanner **402** then performs a corresponding action or function to control the operations of ultrasound scanner **402** based on the received user input (e.g., user input relating to an adjustable parameter). User adjustable parameters to control the operation of ultrasound system **108** or ultrasound probe **202** are also adjustable on a control panel (not shown in **FIG. 4**) of ultrasound scanner **402**.

[0027] According to user habits, choices and practices, users may select and store a user profile in a memory (shown in **FIG. 5**) in controller **104**. The user profile defines user predetermined settings for controlling ultrasound system **108** or ultrasound probe **202** using user actuable input members. For example, a user profile may include presets for imaging optimization controls like gray map, dynamic range, edge enhance, based on the context of the selected probe. In general, user profile includes user adjustable parameters associated with each user actuable input member and preset or predetermined system settings for that user.

[0028] **FIG. 5** is a block diagram of controller **104** in accordance with an exemplary embodiment of the invention. Controller **104** includes at least one user actuable input member **106** and a memory **502**. Although **FIG. 5** shows one user actuable input member **106**, there may be a plurality of user actuable input members **106** included as part of controller **104**. In another embodiment, memory **502** is located outside controller **104**. Memory **502** may be one of a removable non-volatile memory device/card and plug-in drive. Memory **502** stores the user profile corresponding to user actuable input members **106** and any other user presets or predetermined system settings. The contents of the user profile are described in detail in conjunction with **FIG. 6**.

[0029] **FIG. 6** is a block diagram illustrating a user profile stored in a memory **502** (shown in **FIG. 5**) inside controller **104** (shown in **FIG. 1**) in accordance with an exemplary embodiment of the invention. Memory **502** stores a user profile **602**. User profile **602** includes the following columns: tag **604**, parameter **606** and parameter setting **608**. Column tag **604** stores a tag associated with a user actuable input member, for example, the element in the first row of column tag **604** contains 'A', which is the tag associated with user actuable input member **206** (as shown in **FIG. 2**). Column parameter **606** stores a user adjustable parameter. The user adjustable parameter corresponds to a user actuable input member, for example, the element in the first row of column parameter **606** contains 'Parameter P1', which is the user adjustable parameter corresponding to user actuable input member **206**. 'Parameter P1' also defines a user configuration corresponding to user actuable input member **206** that corresponds to a control operation of ultrasound system **108** or ultrasound probe **202**, for example, gain adjustment. Column parameter setting **608** stores a user predefined setting corresponding to user adjustable parameter stored in column parameter **606**. For example, the element in the first row of column parameter setting **608** contains 'Parameter P1 Settings', which is a user predefined setting corresponding to 'Parameter P1' stored in the first row of column parameter **606**. Each row in user profile **602** corresponds to a user actuable input member, for example, the first row corresponds to user actuable input member **206** (as shown in **FIG. 2**). Other known ways of storing user profile in memory **502** also may be used. Further, additional information corresponding to a particular user's presets or predetermined system settings for the ultrasound scanner may be stored (e.g., initial start-up settings). This additional information may include user presets for scanner parameters not directly accessible by user actuable input members, but stored into the memory in response to use activation of a "profile store" command via a user actuable input member **206** or the scanner user interface.

[0030] When a user actuates a user actuable input member, the corresponding user adjustable parameter and user predefined settings for that user adjustable parameter are communicated to ultrasound scanner **402** and the operations of ultrasound scanner **402** can then be controlled. For example, if the user actuates user actuable input member **206**, ultrasound scanner **402** receives a signal that the user is requesting a control operation to control ultrasound scanner **402**, corresponding to 'Parameter P1' with user-predefined settings 'Parameter P1 Settings'. The scanner may also login the user to the system, providing access to HIPA protected data on the scanner.

[0031] In a multi-user environment, user profiles corresponding to a plurality of users may be stored in memory **502**. Users may change their user profiles by reprogramming user actuable input members **106**. Reprogramming of user actuable input members **106** is provided, for example, via a graphical user interface. In one embodiment, the graphical user interface is provided as part of ultrasound scanner **402**. The graphical user interface may be configured, for example, as part of a screen. In the screen, a user can select from a list of control operations that may be assigned to a required user actuable input member. This screen provides, for example, a drop down menu, selection buttons, and other means of selection for reconfiguring the user actuable input members. The various control operations of ultrasound system **108** may be provided to the user for selection through the various selection means. The user also may input the settings and control operations that need to be assigned to each user actuable input member. The graphical user interface also provides a module for enabling control of the interface by a right-handed or a left-handed user. The graphical user interface also allows the user to select from a plurality of ultrasound probes **202** and control their operations connected to ultrasound scanner **402**.

[0032] **FIG. 7** is a block diagram illustrating a set of user identifiers and associated user profiles stored in a memory inside controller **104** (shown in **FIG. 4**) in accordance with an exemplary embodiment of the invention. To differentiate between various user profiles stored in memory **502**, a unique user identifier is utilized for each profile. For example, in a multi-user environment, two users X and Y may use the same user interface **102** (as shown in **FIG. 1**). A unique user identifier X **702** (e.g., unique ID number) is associated with user X having user profile X **706**. Both unique user identifier X **702** and user profile X **706** correspond to the user X. A unique user identifier Y **704** is associated with user Y having user profile Y **708**. Both unique user identifier Y **704** and user profile Y **708** correspond to the user Y. Visual indicia **204** may be utilized to

associate a user with controller **104** (shown in **FIG. 1**). Alternatively, and for example, color-coding of controller **104** may be provided.

[**0033**] User profiles are detected based on the unique user identifiers stored in memory **502**. Ultrasound scanner **402** connected to ultrasound probe **202** automatically detects the user profile, logins the user, and configures controls of ultrasound scanner **402** to control operation of ultrasound probe **202**, as well as the ultrasound scanner **402**, based on the user profile. User X and user Y may re-program user actuable input members according to, for example, their requirements, and therefore, their respective user profiles **706** and **708** are different. For example, the first element in the first row of column parameter **606**, 'Parameter P1', is different from the first element in the first row of column parameter **718**, 'Parameter P4', (e.g., user X actuates 'Parameter P1' by actuating user actuable input member **206**, while user Y actuates 'Parameter P4' by actuating user actuable input member **206**). Thus for the same controller **104**, control operations of ultrasound system **108** or ultrasound probe **202** are enabled for different users according to their requirements, which may include different control operations and/or associating different controls with the user actuable input members.

[**0034**] **FIG. 8** is a flowchart illustrating a method to control ultrasound system **108** in accordance with an exemplary embodiment of the invention. At **802**, a user input is received at ultrasound probe **202** via a user actuable input member. At **804**, the user input is communicated to ultrasound system **108** so that the user can control the operation of ultrasound system **108** or ultrasound probe **202**.

[**0035**] Input is received from the user after the user actuates a user actuable input member. The corresponding user configuration, associated with the user actuable input member being actuated, in the form of user adjustable parameters and associated user predefined settings are then communicated to ultrasound scanner via communication link **404**. Ultrasound scanner **402** then controls the operation of ultrasound probe **202** accordingly.

[**0036**] Various embodiments of the invention may be used to control the operations of an ultrasound probe to generate ultrasound images. Remote operation of ultrasound probe **202** also may be enabled to perform scanning remotely. A user-friendly interface to control ultrasound system **108** or ultrasound probe **202** is provided that reduces the time required by a user to obtain an ultrasound image. Also, reprogramming of control buttons and associated functions are provided.

[**0037**] While the invention has been described in terms of various specific embodiments, those skilled in the art will recognize that the invention can be practiced with modification within the spirit and scope of the claims.

What is claimed is:

1. A user interface for an ultrasound system, the ultrasound system including an ultrasound probe, said user interface comprising:

at least one user actuable input member for controlling operation of the ultrasound system, the at least one user actuable input member being user configurable to control at least one operation of the ultrasound system; and

a controller including the at least one user actuable input member, the controller removably attachable to the ultrasound probe.

2. A user interface in accordance with claim 1 wherein at least one user actuable input member controls at least one scanning operation of the ultrasound system.

3. A user interface in accordance with claim 1 wherein at least one user actuable input member controls at least one non-scanning operation of the ultrasound system.

4. A user interface in accordance with claim 1 wherein the controller comprises a body having a shape corresponding to a portion of the ultrasound probe for removable attachment around at least part of the portion of the ultrasound probe.

5. A user interface in accordance with claim 1 wherein the at least one user actuable input member is reconfigurable.

6. A user interface in accordance with claim 1 wherein the controller is configured to wirelessly communicate with the ultrasound system.

7. A user interface in accordance with claim 1 wherein the controller is configured to communicate with the ultrasound system via a wired connection.

8. A user interface in accordance with claim 1 wherein the at least one user actuable input member is configurable to control at least one user adjustable parameter for controlling operation of the ultrasound system.

9. A user interface in accordance with claim 8 wherein the user adjustable parameter is adjustable on a control panel of the ultrasound system.

10. A user interface in accordance with claim 1 wherein the controller further comprises a memory for storing a user configuration corresponding to the at least one user actuable input member.

11. A user interface in accordance with claim 10 wherein the user configuration defines a control operation adjustable using the at least one user actuable input member.

12. A user interface in accordance with claim 11 wherein the control operation corresponds to a user adjustable parameter for controlling the operation of the ultrasound system.

13. A user interface in accordance with claim 1 wherein the controller further comprises a memory for storing a user profile corresponding to a plurality of user predefined settings for controlling operation of the ultrasound system.

14. A user interface in accordance with claim 13 wherein an ultrasound system connected to the ultrasound probe automatically detects the user profile and configures controls of the ultrasound system based on the user profile.

15. A user interface in accordance with claim 14 wherein the user profile is detected based on a unique user identifier stored in the memory.

16. A user interface in accordance with claim 15 wherein a plurality of user profiles are stored in the memory with a unique user identifier corresponding to each of the user profiles.

17. A user interface in accordance with claim 1 wherein the controller is configured to provide visual indicia to associate a controller with a user.

18. A user interface in accordance with claim 1 wherein the at least one user actuable input member is user programmable via a graphical user interface.

19. A user interface in accordance with claim 1 wherein the user actuable input member is configurable to control operation of a function of the ultrasound probe correspond-

ing to a function available on an ultrasound control panel of an ultrasound scanner connected to the ultrasound probe.

20. A user interface in accordance with claim 1 wherein the user actuable input member comprises at least one of a button, switch, knob, dial and slide.

21. A user interface in accordance with claim 1 wherein the controller comprises a body having arms configured to extend around a portion of the ultrasound probe to removably attach the controller to ultrasound probe.

22. A user interface in accordance with claim 21 wherein the body further comprises a top surface with an extension having the at least one user actuable input member provided as part of the extension.

23. A controller for an ultrasound system having an ultrasound probe, said controller comprising:

means for receiving at least one user input for controlling the ultrasound system;

means for removably attaching the means for receiving to the ultrasound probe; and

means for communicating the at least one received user input to the ultrasound system for controlling the ultrasound system.

24. A controller in accordance with claim 21 further comprising means for storing user defined settings for controlling the ultrasound system.

25. A controller in accordance with claim 21 further comprising means for storing user programmable settings to define the control operation associated with the means for receiving.

26. A controller in accordance with claim 21 wherein the means for communicating comprise one of means for wirelessly communicating and means for communicating via a wired connection with the ultrasound system.

27. A method for controlling an ultrasound system having an ultrasound probe, said method comprising:

receiving a user input at the ultrasound probe, the user input corresponding to a control function for controlling the ultrasound system and configurable by a user; and

communicating the user input to an ultrasound scanner to control operation of the ultrasound system.

* * * * *

专利名称(译)	用于为超声系统提供用户界面的系统和方法		
公开(公告)号	US20060058654A1	公开(公告)日	2006-03-16
申请号	US10/924621	申请日	2004-08-24
当前申请(专利权)人(译)	通用电气公司		
[标]发明人	DI MARCO GEROIS SHAH SNEHAL CHANDRAKANT DWYER JOHN EDWARD JR MILLER STEVEN CHARLES		
发明人	DI MARCO, GEROIS SHAH, SNEHAL CHANDRAKANT DWYER, JOHN EDWARD JR. MILLER, STEVEN CHARLES		
IPC分类号	A61B8/00		
CPC分类号	A61B8/00 A61B8/461 G06F19/3406 A61B8/467 A61B8/465 A61B8/4477 A61B8/585 G16H40/63		
外部链接	Espacenet USPTO		

摘要(译)

提供了用于超声系统的用户界面。超声系统包括超声探头。用户界面包括至少一个用户可致动输入构件，用于控制超声系统的操作。用户可配置至少一个用户可致动输入构件以控制超声系统的至少一个操作。用户界面还具有包括至少一个用户可致动输入构件的控制器。控制器可拆卸地连接到超声探头。