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(54) SCALABLE TELE-CARE MONITORING DEVICE

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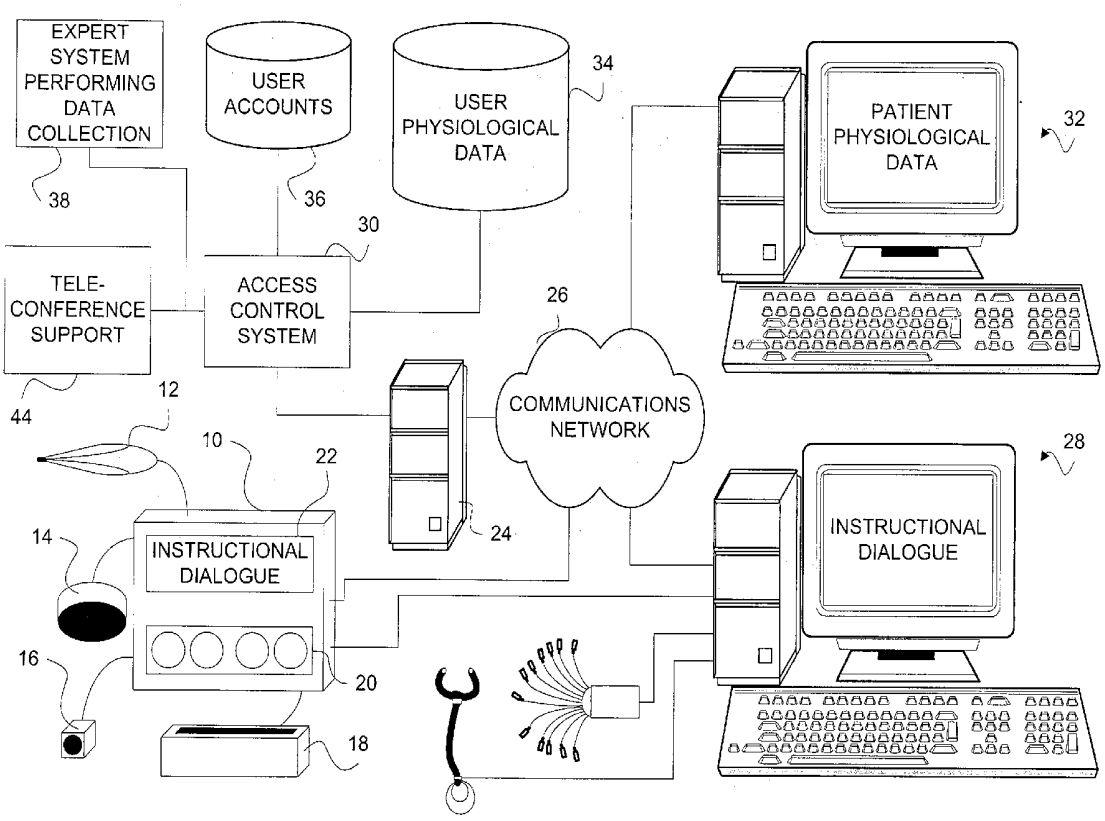
(57) **ABSTRACT**

A scalable tele-care monitoring device has a plurality of physiological sensors adapted to collect patient physiological data. The device also has an interface adapted to connect with a personal computer, and an expansion module adapted to communicate patient physiological data to the personal computer via the interface. In further aspects, the device has an output adapted to communicate the patient physiological data over a communications network when the device is not interfaced with the personal computer.



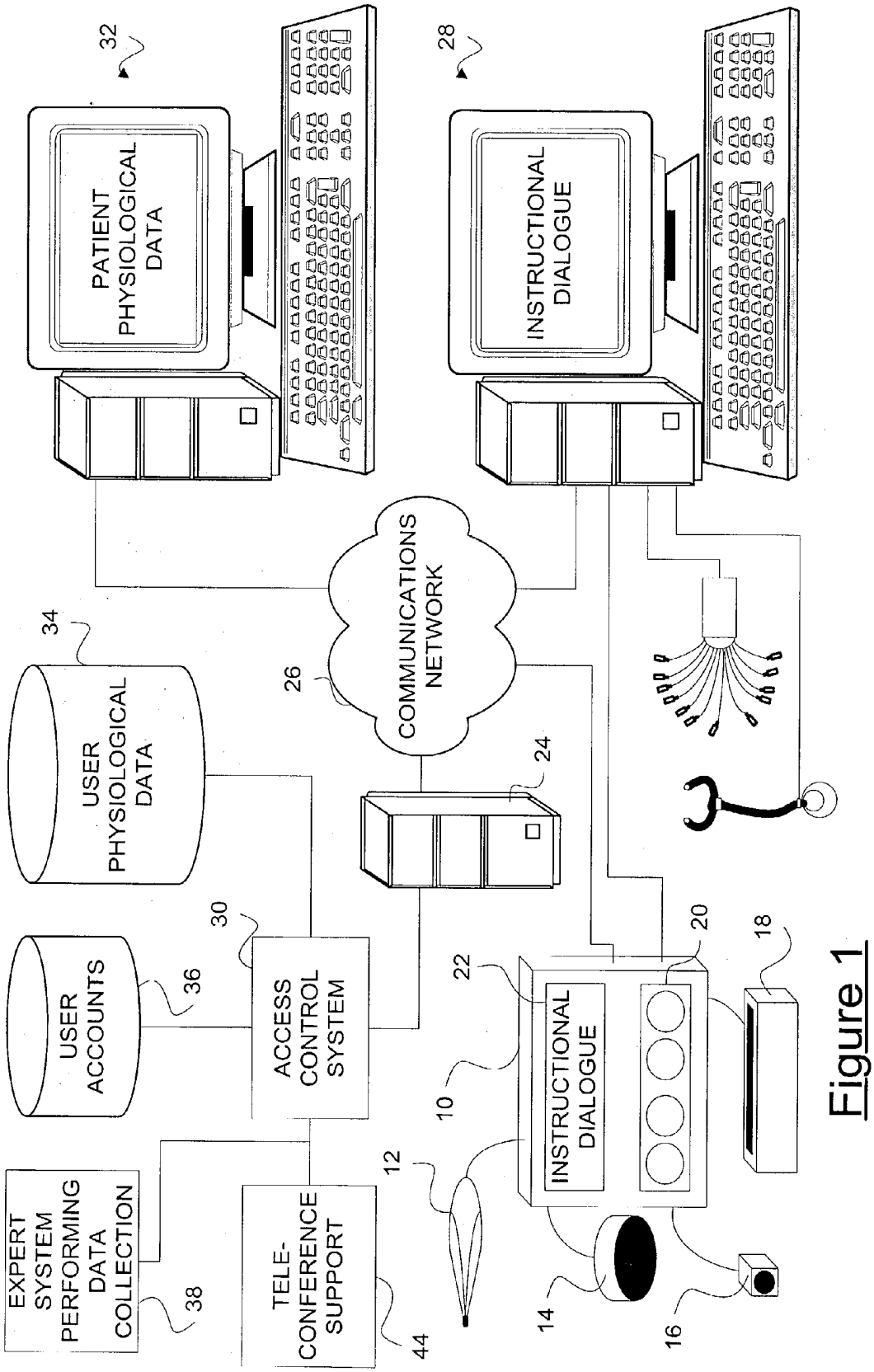

32
PATIENT PHYSIOLOGICAL DATA
28
INSTRUCTIONAL DIALOGUE
COMMUNICATIONS NETWORK
26
34
USER PHYSIOLOGICAL DATA
24
30
USER ACCOUNTS
36
ACCESS CONTROL SYSTEM
22
20
18
10
INSTRUCTIONAL DIALOGUE
12
EXPERT SYSTEM PERFORMING DATA COLLECTION
38
TELE-CONFERENCE SUPPORT
44
14
16

Figure 1

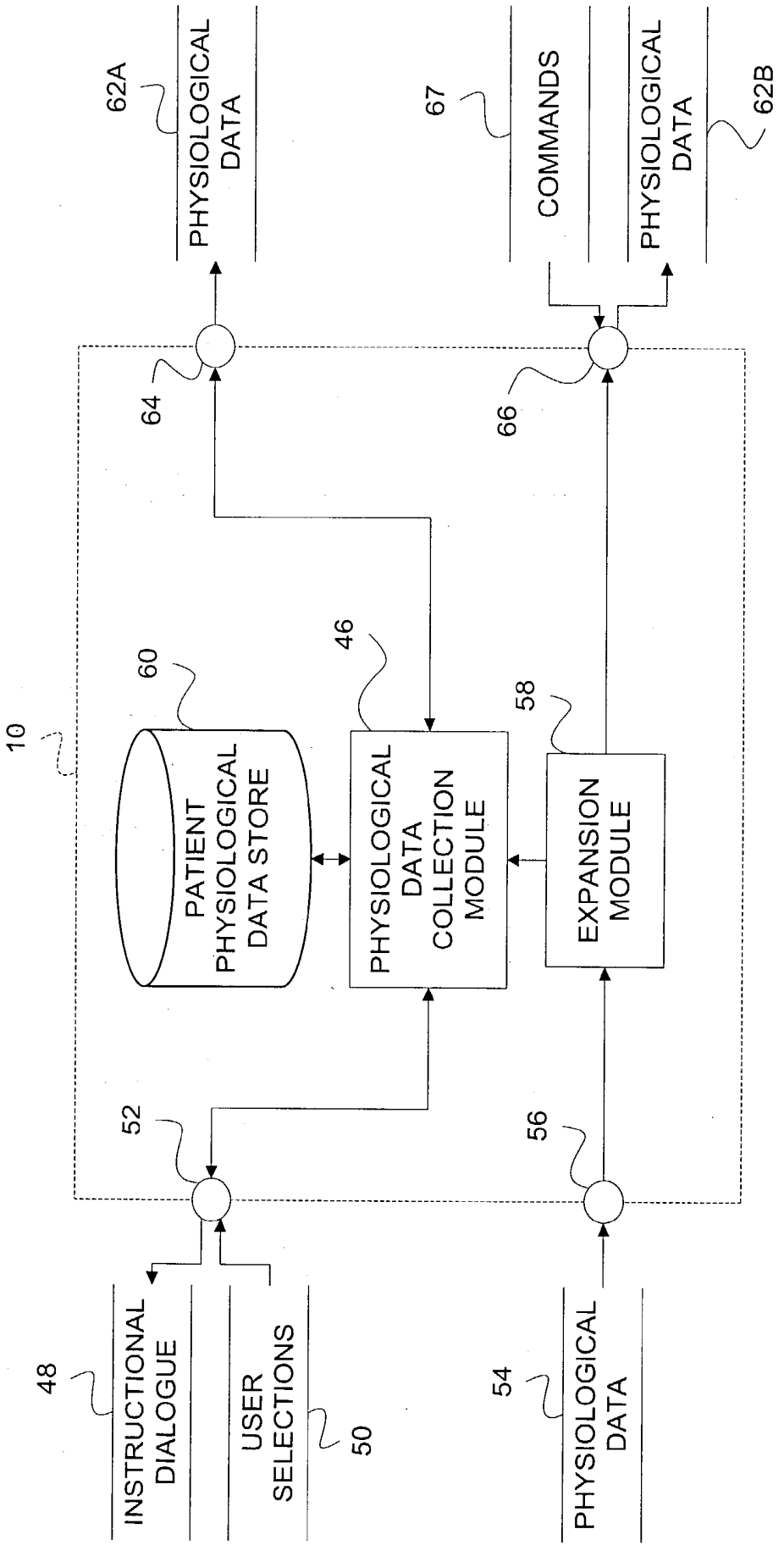

62A
PHYSIOLOGICAL DATA
67
COMMANDS
PHYSIOLOGICAL DATA
62B
64
66
10
60
PATIENT PHYSIOLOGICAL DATA STORE
46
PHYSIOLOGICAL DATA COLLECTION MODULE
58
EXPANSION MODULE
52
56
48
INSTRUCTIONAL DIALOGUE
USER SELECTIONS
50
54
PHYSIOLOGICAL DATA

Figure 2

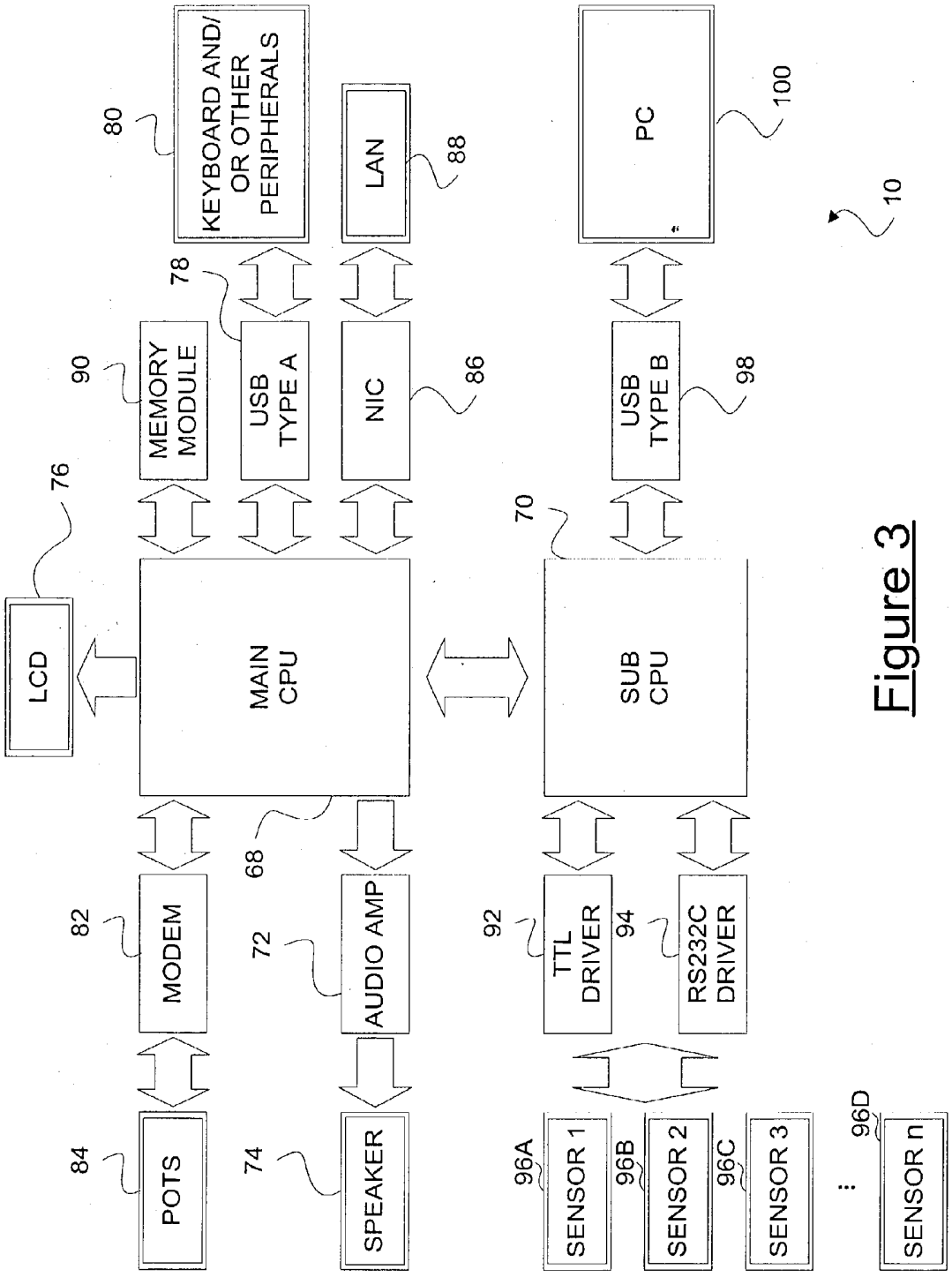

KEYBOARD AND/ OR OTHER PERIPHERALS
80
LAN
88
PC
100
10
78
MEMORY MODULE
90
USB TYPE A
NIC
86
USB TYPE B
98
76
70
LCD
MAIN CPU
SUB CPU
68
82
MODEM
72
AUDIO AMP
92
TTL DRIVER
94
RS232C DRIVER
84
POTS
74
SPEAKER
96A
SENSOR 1
96B
SENSOR 2
96C
SENSOR 3
96D
SENSOR n

Figure 3

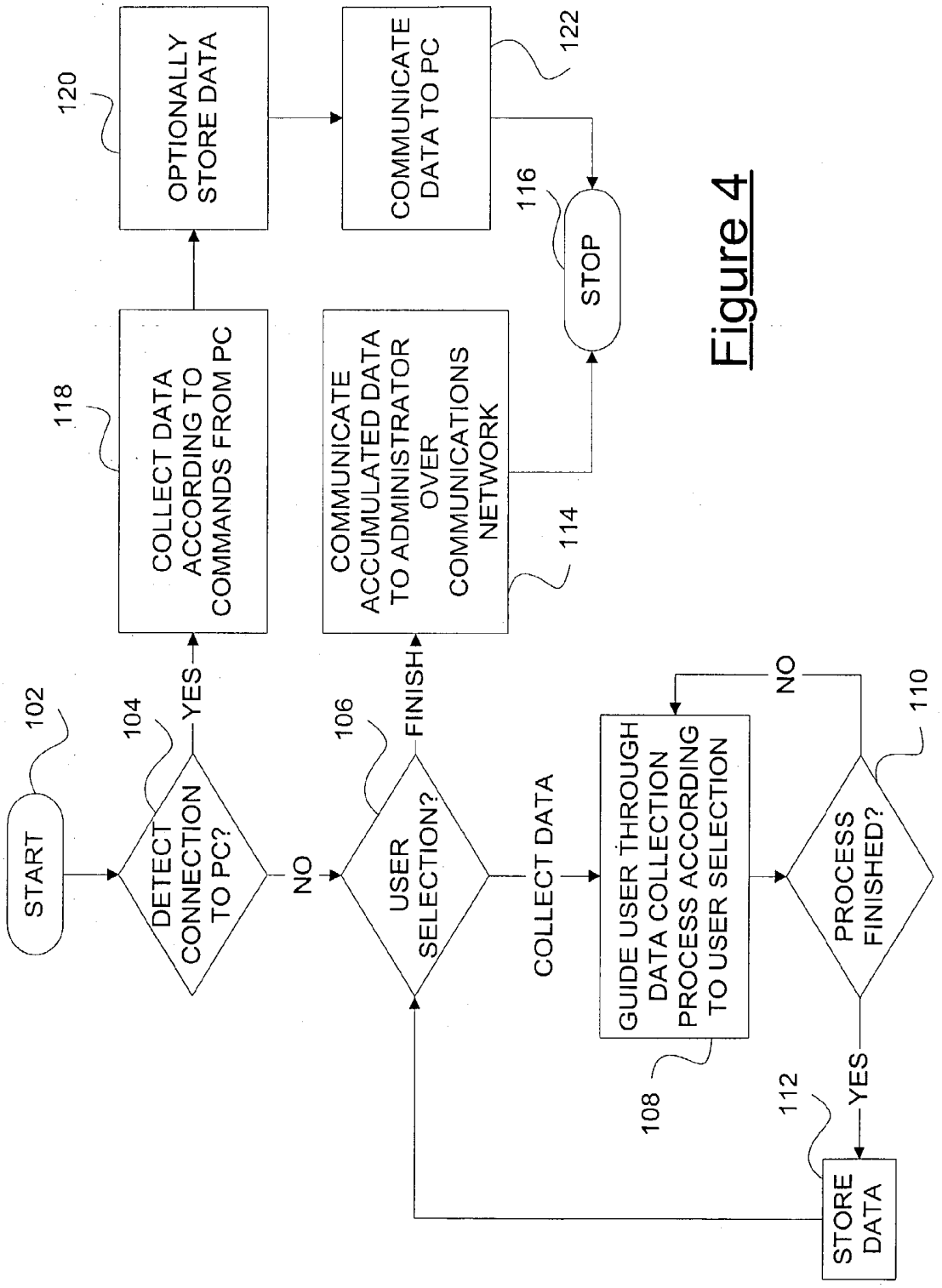

START
102
DETECT CONNECTION TO PC?
104
YES
NO
USER SELECTION?
106
FINISH
COLLECT DATA
GUIDE USER THROUGH DATA COLLECTION PROCESS ACCORDING TO USER SELECTION
108
PROCESS FINISHED?
110
NO
YES
STORE DATA
112
COMMUNICATE ACCUMULATED DATA TO ADMINISTRATOR OVER COMMUNICATIONS NETWORK
114
COLLECT DATA ACCORDING TO COMMANDS FROM PC
118
OPTIONALLY STORE DATA
120
COMMUNICATE DATA TO PC
122
STOP
116

Figure 4

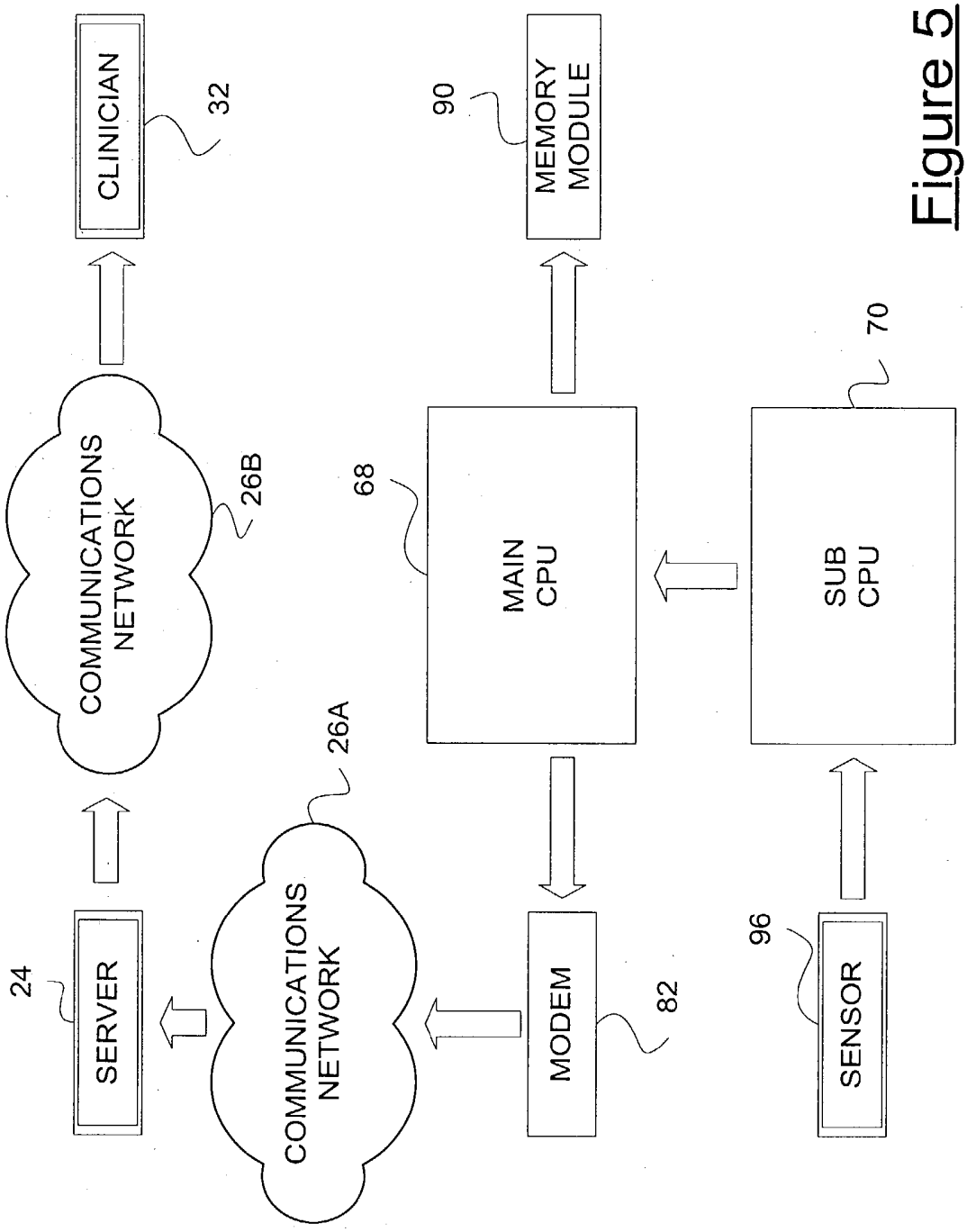

CLINICIAN
32
MEMORY MODULE
90
COMMUNICATIONS NETWORK
26B
MAIN CPU
68
SUB CPU
70
SERVER
24
COMMUNICATIONS NETWORK
26A
MODEM
82
SENSOR
96

Figure 5

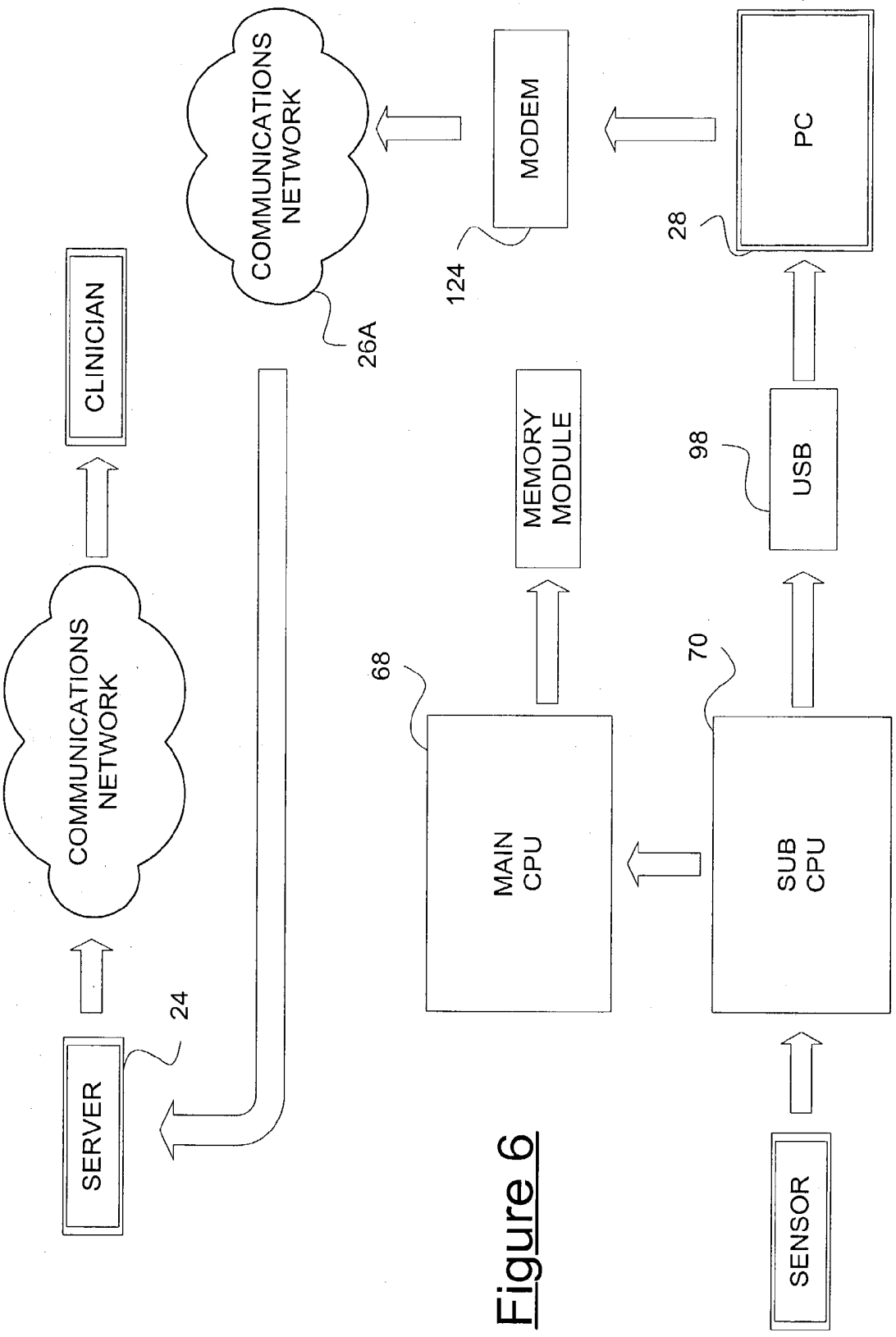

SERVER
24
COMMUNICATIONS NETWORK
CLINICIAN
COMMUNICATIONS NETWORK
26A
MODEM
124
PC
28
MEMORY MODULE
68
MAIN CPU
USB
98
SUB CPU
70
SENSOR

Figure 6

# SCALABLE TELE-CARE MONITORING DEVICE

## FIELD OF THE INVENTION

[0001] The present invention generally relates to tele-care monitoring systems, methods, and devices, and particularly relates to a scalable tele-care monitoring device capable of interfacing with a patient's personal computer, thereby achieving expanded functionality.

## BACKGROUND OF THE INVENTION

[0002] Today's tele-care monitoring devices are often prohibitively expensive and/or limited in-functionality without the ability to interface with one another in a complementary fashion. For example, a tele-care monitoring device is taught in U.S. Pat. No. 6,402,691, entitled In-Home Patient Monitoring System, and issued to Peddicord et al. This device is capable of collecting patient physiological data in the form of a blood pressure reading, temperature reading, pulse oximeter reading, and/or weight reading, and communicating the data to a clinician over a communications network. This device, however, does not have the ability to implement health care monitoring equipment to collect and transmit large amounts of audio data in digital form, such as with an electrocardiograph and/or stethoscope, nor does it provide teleconferencing capability.

[0003] Some commercially available stethoscopes and electrocardiographs are capable of interfacing with a patient's personal computer (PC) and/or handheld device via an audio input and complementary software, thereby creating a wave file recording user physiological data. Examples of such equipment include the Meditron Sensor-Based Stethoscope System and the IQMark Digital ECG.

[0004] A maker of tele-care monitoring systems and devices is presented with competing needs of less critical patients who do not require collection and telecommunication of digital audio data, and more critical patients who require collection and telecommunication of both digital readings and digital audio data. For example, requiring acquisition of a PC or monitoring device capable of collecting and communicating audio data presents increased expense for less critical patients and/or their care-givers. Also, requiring purchase of a dedicated device for digital readings presents an inconvenience for the more critical patients and/or caregivers based on the need to undergo separate data collection and communication procedures between devices. Further, caregivers of patients and/or patients transitioning from less critical status to more critical status may be faced with the need to either purchase an entirely new device capable of collecting and communicating digital readings and digital audio data, or undergo separate collection/communication procedures with separate devices.

[0005] The need remains for a tele-care monitoring device that is designed to be inexpensive for less critical patients, and is expandable for more critical patients without requiring purchase of a separate device having functionality that is redundant with functionality of a device already owned. The need further remains for a monitoring device that is capable of expanding by integrating with a PC already owned by a patient or caregiver, so that less additional expense is incurred. Finally, the need remains for an inexpensive monitoring device that is capable of integrating with a PC to provide teleconferencing capability, thereby permitting patient monitoring procedures to be conducted under long-distance supervision of a clinician. The present invention fulfills the aforementioned needs.

## SUMMARY OF THE INVENTION

[0006] According to the present invention, a tele-care monitoring device has a plurality of physiological sensors adapted to collect patient physiological data. The device also has an interface adapted to connect with a personal computer, and an expansion module adapted to communicate patient physiological data to the personal computer via the interface. In further aspects, the device has an output adapted to communicate the patient physiological data over a communications network when the device is not interfaced with the personal computer.

[0007] It should be understood that the detailed description and specific examples, while indicating the preferred embodiment of the invention, are intended for purposes of illustration only and are not intended to limit the scope of the invention.

## BRIEF DESCRIPTION OF THE DRAWINGS

[0008] The present invention will become more fully understood from the detailed description and the accompanying drawings, wherein:

[0009] **FIG. 1** is a partial perspective block diagram depicting a scalable tele-care monitoring system according to the present invention;

[0010] **FIG. 2** is a block diagram depicting a scalable tele-care monitoring device according to the present invention;

[0011] **FIG. 3** is a block diagram depicting the preferred embodiment of a scalable tele-care monitoring device according to the present invention;

[0012] **FIG. 4** is a flow diagram depicting a method of operation for a tele-care monitoring device according to the present invention;

[0013] **FIG. 5** is a block and flow diagram depicting a first route for communication of patient physiological data according to the present invention; and

[0014] **FIG. 6** is a block and flow diagram depicting a second route for communication of patient physiological data according to the present invention.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0015] The following description of the preferred embodiment(s) is merely exemplary in nature and is in no way intended to limit the invention, its application, or uses.

[0016] According to the present invention and as illustrated in **FIG. 1, a** scalable tele-care monitoring system includes scalable tele-care monitoring device **10**, which is operable to obtain patient physiological data via a plurality of sensors, such as digital thermometer **12**, blood pressure gauge **14**, pulse oximeter **16**, and scale **18**. Additional or alternative digital sensors include a pedometer, a blood glucose meter, a spirometer, and/or a sensor for measuring international normalized ratio of prothrombin time (PT/

INR). It also has a user interface, including user input devices **20** allowing a user to make selections, and a user output device **22** communicating information to the user. Preferably, user input devices **20** have 10 keys for input of numeric data, and device **10** can accept numeric input. This capability allows a user to preferably use their own familiar sensor that is not supported by device **10**. It further has an output (not shown) adapted to communicate collected patient physiological data to acquisition server **24** over communications network **26**. Finally, it has an interface (not shown) for connecting to PC **28**, and adapted to communicate the patient physiological data to PC **28**.

[**0017**] Acquisition server **24** has access control system **30** adapted to control access of device **10**, PC **28**, and clinician computer **32** to services of server **24**. For example, access control system **30** is adapted to store user physiological data received from device **10** and/or PC **28** in data store **34** in accordance with user accounts information **36**; it also allows a clinician to access data store **34** and retrieve the user physiological data. Server **24** is further adapted to provide expert system **38** to PC **28**, thus enabling PC **28** to guide a user through a physiological data collection process that includes using PC **28** to obtain physiological data via device **10**, and affecting communication of the physiological data from PC **28** to acquisition server **24**.

[**0018**] According to various embodiments for use with the Internet, system **38** is provided as a website with appropriate servlets, applets, and/or plugins, as a website with downloadable software, and/or on one or more data storage components provided as complimentary software to device **10**. If system **38** is at least partially installed on PC **28**, then it can be configured to automatically launch upon detection of connection with device **10**. PC **28** thus tracks whether a device is connected through a USB port provided to PC **28** and, if detecting connection of device **10**, launches software according to predetermined criteria.

[**0019**] Principally, system **38** provides an instructional dialogue guiding the user through the data collection process, using sensors provided to device **10**, and using additional sensors, such as stethoscope **40** and electrocardiograph **42**, provided to PC **28**. System **38** further provides additional functions, such as graphic display of data stored in device **10**, on PC **28**, and/or in data store **34**. It also offers more complex questionnaires than device **10**, even with respect to performing diagnosis with sensors provided to device **10**. It provides more advanced instruction as well, especially in relation to use of voice and pictures to provide instruction. It additionally offers web browsing capability that provides medical related information and/or questionnaires, wherein the information and/or questionnaires can be selected for and communicated to the user by the expert system. Thus, the system of the present invention capitalizes on PC **28**'s ability to collect and store large amounts of audio data and to interface with device **10**, thereby collecting more types of data in one step and storing it on line in data store **34** for evaluation by a clinician. It also capitalizes on the ability to provide superior instructions in the form of video demonstrations and/or video conference-based supervision. Further embodiments also permit device **10** to have limited web browsing capability for acquiring questionnaires over the communications network that are provided to web browsers via expert system **38**.

[**0020**] The system of the present invention preferably supports teleconferencing between a clinician and a user via PC **28** using a separate line to support video conferencing capability. Thus, PC **28** and computer **32** preferably have teleconference software installed as well as cameras, head phones, and H324 compliance modems, and are directly connected by telephone line via modem on each side. In this case, the communication protocol is raw data communication (H324) and not Internet Protocol (IP).

[**0021**] In an alternative embodiment, IP format can be used for video and/or audio teleconferencing. For example, server **24** can provide teleconferencing support by serving as an intermediary of teleconferencing information. Alternatively, peer to peer communication functionality in an IP format can be provided to PC **28** and computer **32**, either as a download or as software provided on a data storage medium. As a result, a user and/or clinician can initiate a call by clicking on an icon on the respective computer's desktop, and/or select a function in a program running on the computer. As a result, a user of device **10** can call for assistance via PC **28** by clicking on an icon provided on a website running on server **24**, thereby initiating a teleconferencing call with computer **32**; a clinician reviewing patient physiological data can similarly initiate a teleconference. The clinician, in turn, obtains access to the user physiological data via computer **32** using a web browser.

[**0022**] **FIG. 2** illustrates device **10**, which has physiological data collection module **46** adapted to generate instructional dialogue **48** guiding a user through the data collection process. Instructional dialogue **48** is generated in response to user selections **50** communicated to module **46** via user interface **52**, and instructional dialogue **48** is also communicated to the user via user interface **52**. In normal operation, patient physiological data **54** is obtained via plurality of sensors **56**, and routed through expansion module **58**, which selects an active sensor in response to commands from module **46**, to module **46**, which stores collected data in data store **60**. Module **46** then sends collected data **62**A over a communications network (not shown) via output **64**. Device **10** further has interface **66**, which is adapted to connect to a PC (not shown). Expansion module **58** continuously monitors interface **66**, and, upon detecting connection to a PC via interface **66**, expansion module **58** causes module **46** to cease normal operation, and begins routing collected physiological data **62**B to the PC via interface **66**. Module **58** further selects an active sensor in response to commands **67** from the PC. In the preferred embodiment, physiological data **54** is also routed to module **46** for storage in data store **60**, so that a record is maintained.

[**0023**] The preferred embodiment of device **10** is illustrated in **FIG. 3**. For example, device **10** has a main central processing unit **68** serving as the data collection module, and a subordinate central processing unit **70** serving as the expansion module. Also, audio amp **72** and speaker **74** serve as one user output component, while liquid crystal display **76** serves as another user output component. Further, Type A USB port **78** and peripheral input devices **80** serve as an input component, and the aforementioned components combine to form a user interface. Still further, device **10** has a modem **82** connecting to plain old telephony service **84**, and network interface card **86** connecting to line access network **88**. As a result, device **10** has an output capable of connecting to an administration server in a variety of ways. Yet

further, device **10** has a memory module **90**, such as a disc, hard drive and/or flash memory, storing patient physiological data. Even further, device **10** has transistor-transistor logic driver **92** and/or RS232C driver **94** connecting to plurality of sensors **96**A-**96**D and serving as a sensory input. Finally, Type B USB port **98** connects to PC **100**, thus serving as an interface.

[**0024**] A method of operation for a scalable tele-care monitoring device is illustrated in **FIG. 4**. Beginning at **102**, the method includes detecting connection to a PC at **104**, and switching between a normal and passive mode based on whether the device is connected to the PC. This operation can be performed by a control system that is always active and running in the background, or a switch that causes a different set of circuitry to be engaged when a particular connection is made. The device operates in normal mode when the PC is not connected, and in passive mode when the PC is connected.

[**0025**] In normal mode, the device operates in response to user selections as at **106** that the user inputs to the device through a user interface provided to the device. Thus, the device guides the user through the data collection process at **108** depending on selections made by the user. For example, when the user selects to collect data with a particular type of sensor, the device activates the sensor, deactivates any other active sensors, and issues text and/or voice-based instructions for applying the sensor to the patient, who may be the user. Alternatively, the device can instruct the user to toggle a switching mechanism provided to the device for activating a sensor in favor of other sensors. Then, when the data collection process has been finished as at **110**, the collected data is stored in the device and the user is prompted for another selection at **106**. The user can then select another data collection process, or select to finish and transmit the collected data. In the latter case, the accumulated data is communicated at **114** to the administration server over a communications network, such as the Internet, and the method ends at **116**.

[**0026**] In passive mode, the device is adapted to display its state change on an active display provided to the device, and to retain its sensory function, but to no longer provide instructions to the user. The assumption made in operation of the device is that the user receives all instructions from the connected PC, which are superior due to their ability to provide video instructions. Thus, the device obtains sensory data at **118** in response to instructions from the PC, not selections from the user, and activates a sensor in favor of other sensors in response to those instructions. An instruction from the expansion module to the data collection module causes it to merely to optionally store data at **120**, and the instruction identifies the type of data being stored. Alternatively, the device simply routes any sensory input to the PC and allows the PC to instruct the user to toggle a switching mechanism provided to the device that activates one sensor in favor of other sensors. Such a switching mechanism can also serve to identify the data for optional storage in a data store on the device at **120**. In either case, the device communicates the sensed data at **122** to the PC as it is collected, and the method ends at **116**.

[**0027**] Two routes of communication for obtained data according to the present invention are illustrated in **FIGS. 5 and 6**. These routes differ in that, **FIG. 5** illustrates a route for communication of obtained data from the sensor to the clinician when the scalable device is operating in normal mode, while **FIG. 6** illustrates a route of communication of obtained data from the sensor to the clinician when the scalable device is operating in passive mode due to connection with a PC. For example, the route of communication illustrated in **FIG. 5** proceeds from sensor **96** to subordinate central processing unit **70**, and to main central processing unit **68**. Main central processing unit **68** optionally splits the route by optionally storing the obtained data in memory module **90**, in addition to outputting the data via an output device, such as modem **82** to communications network **26**A. The data is routed to acquisition server **24**, which, in turn, routes the data through communications network **26**B to the clinician via clinician computer **32**. Further, the route of communication illustrated in **FIG. 6** differs from that of **FIG. 5** in that main central processing unit **68** (**FIG. 6**) does not output the data to communications network **26**A. Instead, subordinate central processing unit communicates the data to PC **28** via USB port **98**, and PC **28** outputs the data to communications network via its own modem **124**, causing it to be routed to acquisition server **24**.

[**0028**] The description of the invention is merely exemplary in nature and, thus, variations that do not depart from the gist of the invention are intended to be within the scope of the invention. Such variations are not to be regarded as a departure from the spirit and scope of the invention.

What is claimed is:

**1**. A scalable tele-care monitoring device, comprising:

a plurality of physiological sensors adapted to collect patient physiological data;

an interface adapted to connect with a personal computer; and

an expansion module adapted to communicate patient physiological data to the personal computer via said interface.

**2**. The device of claim 1, further comprising a data store adapted to store the patient physiological data.

**3**. The device of claim 1, further comprising:

a data collection module adapted to generate an instructional dialogue guiding a user through a data collection process; and

a user interface communicating the instructional dialogue to the user.

**4**. The device of claim 1, further comprising:

a data collection module adapted to generate an instructional dialogue guiding a user through a data collection process in response to a user selection relating to a type of physiological sensor; and

a user interface communicating the user selection to the data collection module.

**5**. The device of claim 1, further comprising an output adapted to communicate the patient physiological data over a communications network.

**6**. The device of claim 1, further comprising:

a data collection module adapted, under normal operation, to communicate physiological data over a communications network;

wherein said expansion module is adapted to continuously monitor said interface, detect connection with the personal computer via said interface, and cause said data collection module to cease normal operation upon detecting connection with the personal computer via said interface.

**7**. The device of claim 1, further comprising:

a data collection module adapted, under normal operation, to generate an instructional dialogue guiding a user through a data collection process,

wherein said expansion module is adapted to continuously monitor said interface, detect connection with the personal computer via said interface, and cause said data collection module to cease normal operation upon detecting connection with the personal computer via said interface.

**8**. The device of claim 1, further comprising:

a data collection module adapted to communicate physiological data over a communications network; and

a user interface have an input mechanism permitting a user to input numerical data in place of a sensor reading.

**9**. The device of claim 1, wherein said plurality of physiological sensors includes a blood pressure gauge.

**10**. The device of claim 1, wherein said plurality of physiological sensors includes a pulse oximeter.

**11**. The device of claim 1, wherein said plurality of physiological sensors includes a thermometer.

**12**. The device of claim 1, wherein said plurality of physiological sensors includes a scale.

**13**. The device of claim 1, wherein said plurality of physiological sensors includes a blood glucose meter.

**14**. The device of claim 1, wherein said plurality of physiological sensors includes a PT/INR sensor.

**15**. The device of claim 1, wherein said plurality of physiological sensors includes a spirometer.

**16**. The device of claim 1, wherein said plurality of physiological sensors includes a pedometer.

**17**. A scalable tele-care monitoring system, comprising:

an acquisition server connected to a communications network and adapted to receive patient physiological data over the communications network, to store the patient physiological data, and to communicate the patient physiological data to a clinician over the communications network;

a scalable tele-care monitoring device operably connectable to the communications network, adapted to obtain patient physiological data, and adapted to communicate the patient physiological data to said acquisition server over the communications network, wherein said device has an interface adapted to connect with a personal computer operably connected to the communications network, and adapted to communicate the patient physiological data to the personal computer; and

an expert system guiding a user through a physiological data collection process that includes using the personal computer to obtain physiological data via said device, and affecting communication of the physiological data from the personal computer to the acquisition server.

**18**. The system of claim 17, wherein said device is adapted to communicate the patient physiological data to said acquisition server over the communications network only under normal operation, and is further adapted to cease normal operation upon connection to the personal computer via the interface.

**19**. The system of claim 17, wherein said device is adapted to guide the user through a physiological data collection process via said device only under normal operation, and is further adapted to cease normal operation upon connection to the personal computer via the interface.

**20**. The system of claim 17, wherein said expert system is adapted to include collection of patient physiological data corresponding to digital audio data, and to affect communication of the digital audio data to the acquisition server over the communications network.

**21**. The system of claim 17, wherein the personal computer has an electrocardiograph, and said expert system is adapted to employ the electrocardiograph to collect patient physiological data.

**22**. The system of claim 17, wherein the personal computer has a stethoscope, and said expert system is adapted to employ the stethoscope to collect patient physiological data.

**23**. The system of claim 17, wherein said device has a pulse oximeter, and said expert system is adapted to employ the pulse oximeter to collect patient physiological data.

**24**. The system of claim 17, wherein said device has a blood pressure gauge, and said expert system is adapted to employ the blood pressure gauge to collect patient physiological data.

**25**. The system of claim 17, wherein said device has a thermometer, and said expert system is adapted to employ the thermometer to collect patient physiological data.

**26**. The system of claim 17, wherein said device has a scale, and said expert system is adapted to employ the scale to collect patient physiological data.

**27**. The system of claim 17, wherein said device has a spirometer, and said expert system is adapted to employ the spirometer to collect patient physiological data.

**28**. The system of claim 17, wherein said device has a pedometer, and said expert system is adapted to employ the pedometer to collect patient physiological data.

**29**. The system of claim 17, wherein said device has a blood glucose meter, and said expert system is adapted to employ the blood glucose meter to collect patient physiological data.

**30**. The system of claim 17, wherein said device has a PT/INR sensor, and said expert system is adapted to employ the PT/INR sensor to collect patient physiological data.

**31**. The system of claim 17, wherein said acquisition server is adapted to support teleconferencing capability between the clinician and the personal computer via the communications network.

**32**. The system of claim 17, wherein the personal computer and a clinician computer are equipped with video conferencing equipment, thereby being adapted to provide mutual communication between the clinician and the user.

**33**. The system of claim 17, wherein said expert system is provided online via web browsing capability, and provides questionnaires to the user, and said device has a web browsing capability.

**34**. The system of claim 17, wherein said expert system is provided as installable software to the personal computer, and is adapted to provide questionnaires to the user via the personal computer.

**35**. A method of operation for a scalable tele-care monitoring device, comprising:

determining whether a connection to a personal computer has been established;

obtaining patient physiological data; and

communicating the patient physiological data to the personal computer if the connection is established; and

communicating the patient physiological data to an acquisition server over a communications network if the connection is not established.

**36**. The method of claim 35, further comprising guiding a user through a data collection process if the connection is not established.

**37**. The method of claim 35, wherein said obtaining patient physiological data includes sensing patient temperature via a thermometer.

**38**. The method of claim 35, wherein said obtaining patient physiological data includes sensing patient pulse oxygen level via a pulse oximeter.

**39**. The method of claim 35, wherein said obtaining patient physiological data includes sensing patient blood pressure via a blood pressure gauge.

**40**. The method of claim 35, wherein said obtaining patient physiological data includes sensing patient weight via a scale.

**41**. The method of claim 35, wherein said obtaining patient physiological data includes sensing patient blood glucose level via a blood glucose meter.

**42**. The method of claim 35, wherein said obtaining patient physiological data includes sensing patient lung condition via a spirometer.

**43**. The method of claim 35, wherein said obtaining patient physiological data includes sensing patient movement via a pedometer.

**44**. The method of claim 35, wherein said obtaining patient physiological data includes sensing patient PT/INR via a PT/INR sensor.

**45**. The method of claim 35, further comprising continuously monitoring an interface adapted to connect to a personal computer.

**46**. The method of claim 35, further comprising storing patient physiological data in a data store.

**47**. The method of claim 35, further comprising accepting user numerical input in place of a sensor reading.

**48**. A method of monitoring health of a patient via a communications network, comprising:

providing an expandable device adapted to obtain patient physiological data, adapted to communicate patient physiological data over the communications network, and adapted to interface with a personal computer;

providing an expert system adapted to guide a user of the device through a data collection process using the device interfaced with the personal computer, and adapted to affect communication of the patient physiological data over the communications network via the personal computer;

receiving the patient physiological data over the communications network; and

communicating the patient physiological data to a clinician over the communications network.

**49**. The method of claim 48, further comprising storing received patient physiological data.

**50**. The method of claim 48, further comprising providing teleconferencing services between the clinician and the personal computer.

**51**. The method of claim 50, wherein said providing teleconferencing services between the clinician and the personal computer includes providing videoconferencing services via a phone line connected by modem to the personal computer and a clinician computer, wherein the personal computer and the clinician computer have teleconferencing software and audio visual equipment supporting the video conferencing capability.

**52**. A method of monitoring patient health via a communications network, comprising:

acquiring patient physiological data via a clinician computer;

evaluating the completed questionnaire on the clinician computer; and

teleconferencing with the patient via the clinician computer.

**53**. The method of claim 52, wherein said acquiring a completed questionnaire includes:

browsing the Internet via the clinician computer;

accessing a website storing patient physiological data; and

downloading the physiological data from the website over the Internet.

**54**. The method of claim 52, wherein said teleconferencing includes video conferencing with the patient via a phone line connected by modem to the clinician computer and a personal computer of the patient.

**55**. A method of operation for a personal computer for use in expanding functionality of a tele-care device capable of interfacing with the personal computer, comprising:

monitoring an interface capable of connecting with peripheral devices;

detecting connection with the tele-care device via the interface, wherein the telecare device has a plurality of digital physiological sensors;

launching a program for obtaining patient physiological data in response to said detecting connection with the tele-care device;

guiding the user through a data collection process via the program, including use of sensors of the tele-care device to obtain physiological data;

receiving patient physiological data from the telecare device; and

communicating the physiological data over a communications network.

**56**. The method of claim 55, further comprising:

guiding the user through an audio data collection process via the program, including using audio sensors not provided to the tele-care device to collect patient physiological data in a wave form; and

receiving audio data from the audio sensors, thereby collecting patient physiological data in a wave form.

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摘要(译)

可扩展的远程护理监视设备具有多个适于收集患者生理数据的生理传感器。该设备还具有适于与个人计算机连接的接口，以及适于通过接口将患者生理数据传送到个人计算机的扩展模块。在其他方面，该设备具有输出，适于在该设备未与个人计算机连接时通过通信网络传送患者生理数据。