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(54) DATA TRANSFER SYSTEM

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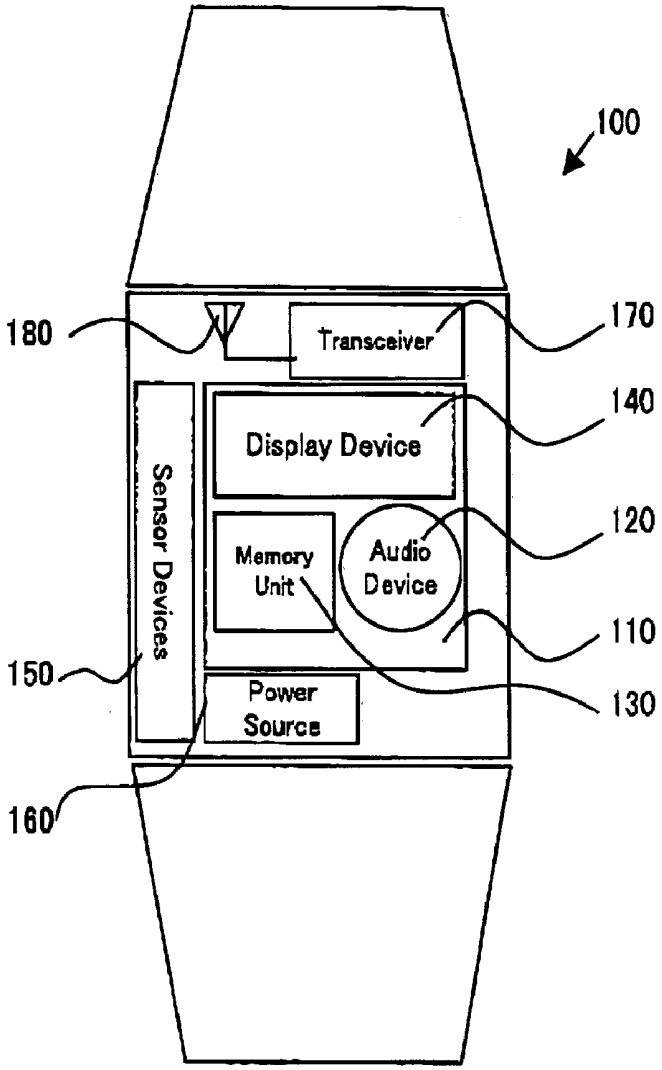
(57) **ABSTRACT**

Providing the data transfer equipment that perform transmission and reception with low power consumption. The radio equipment of the mobile station is wore by a living organism and collects the information related the living organism. The collected information related to the living organism is converted into the signal of information and sent over to the radio equipment of the immobile station. The radio equipment of the immobile station receives the information from the radio equipment of the mobile station. When the radio equipment of the mobile station sends the information described before to the radio equipment of the immobile station, The radio equipment of the immobile station sends a command for the radio equipment of the mobile station to start sending the information. When the radio equipment received the command, the radio equipment of the mobile station starts sending the signals containing the information.



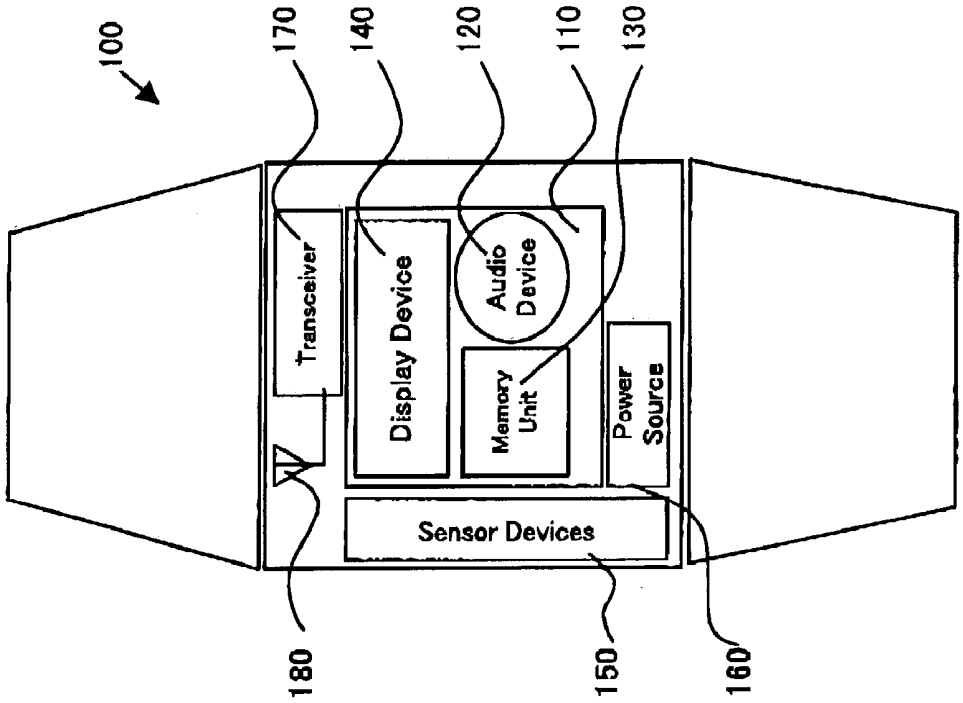

100
170
140
120
110
130
Transceiver
Display Device
Audio Device
Memory Unit
Power Source
Sensor Devices
180
150
160

Fig. 1

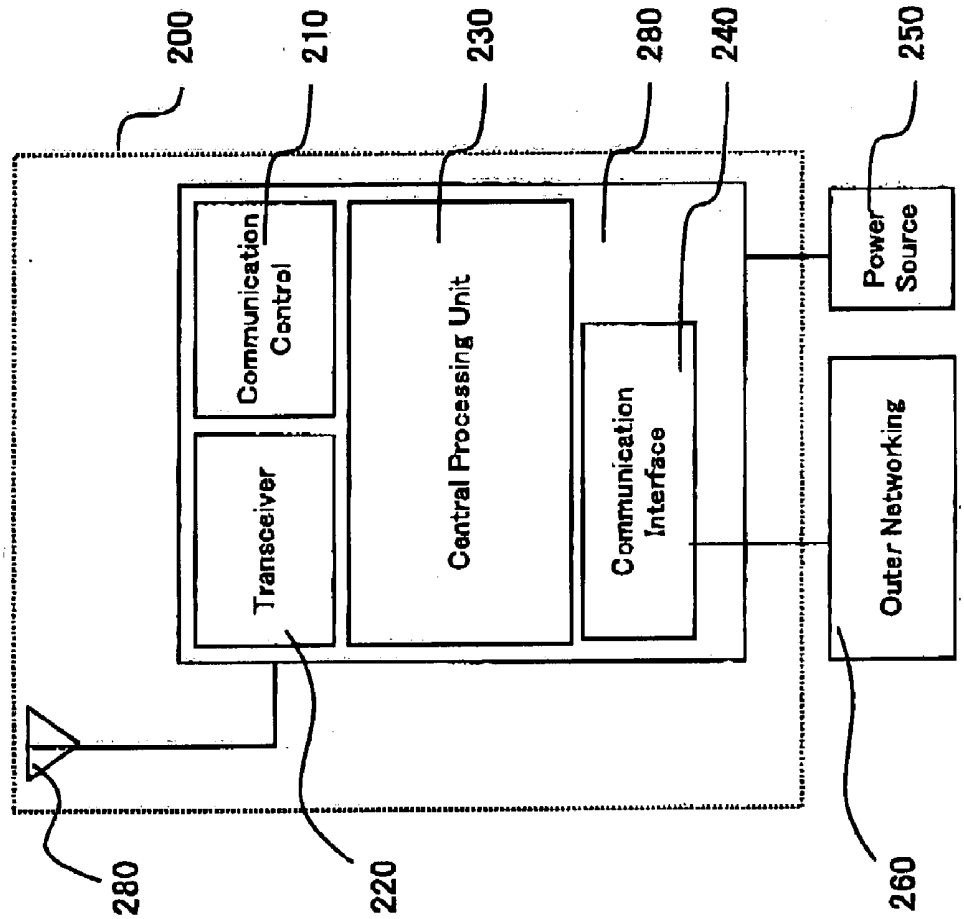

200
210
230
280
240
250
Communication Control
Central Processing Unit
Power Source
Communication Interface
Transceiver
Outer Networking
280
220
260

Fig. 2

Fig. 3

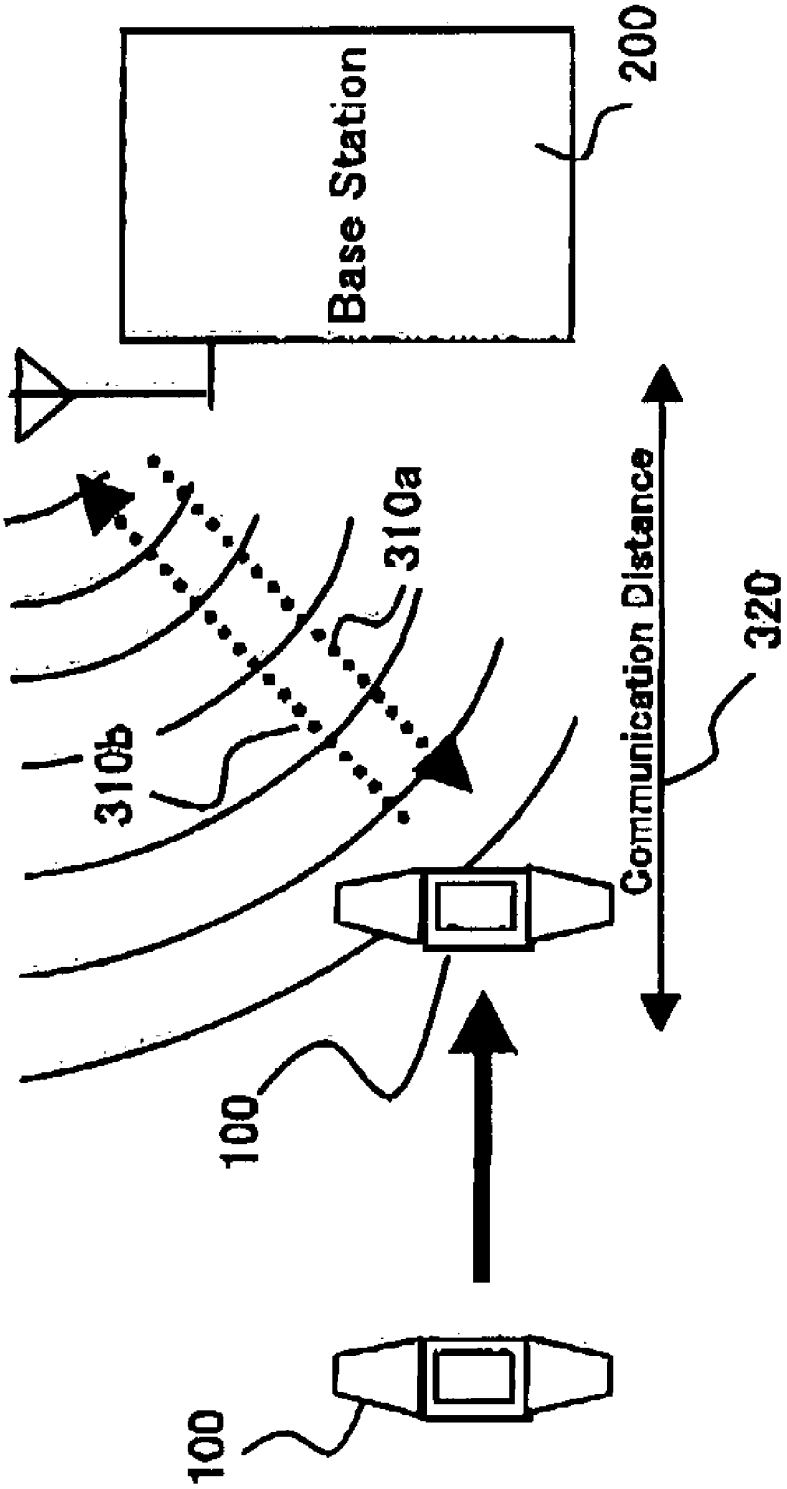
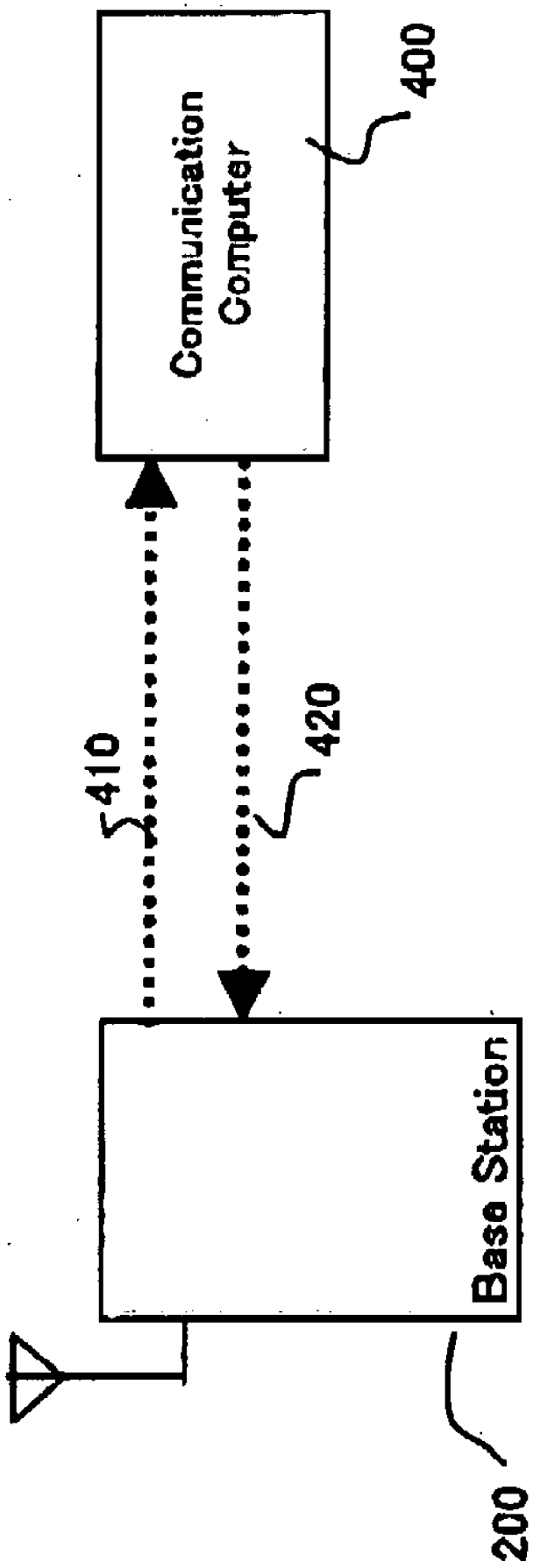

Base Station
200
310a
310b
Communication Distance
320
100
100

Fig. 4



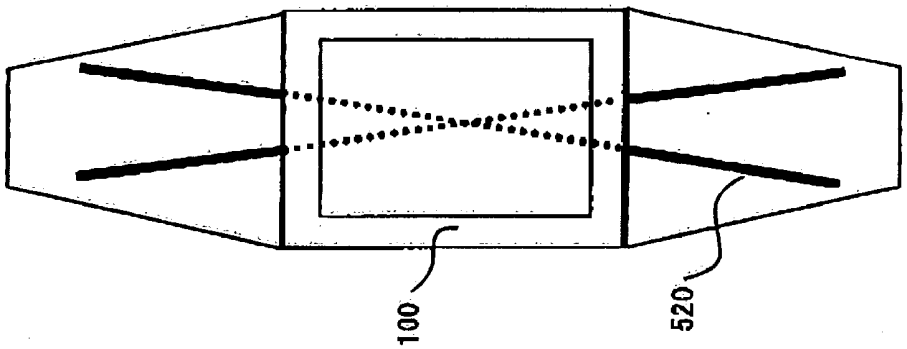



Fig. 5B

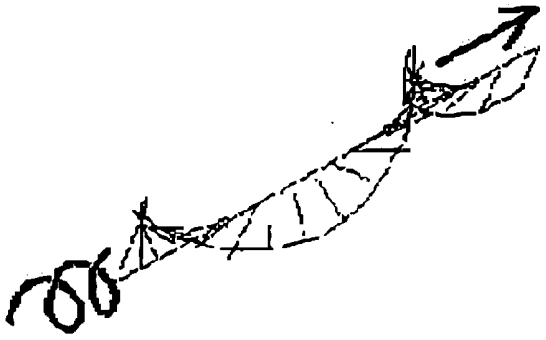


Fig. 5D

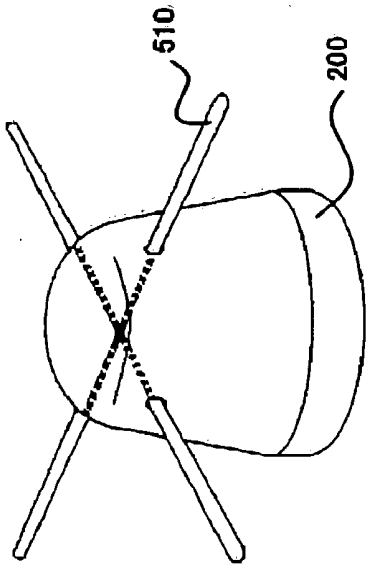



Fig. 5A

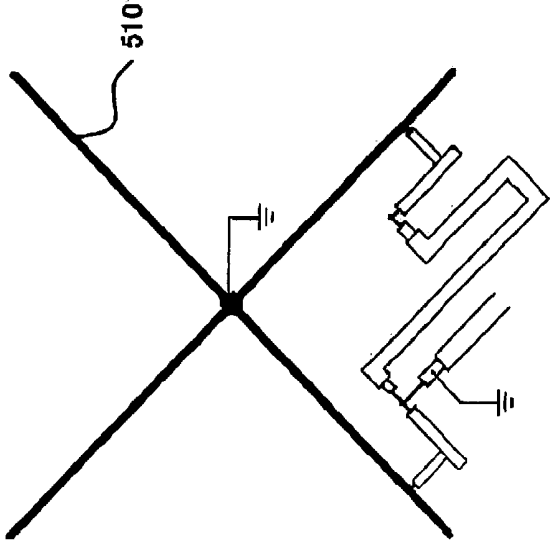



Fig. 5C

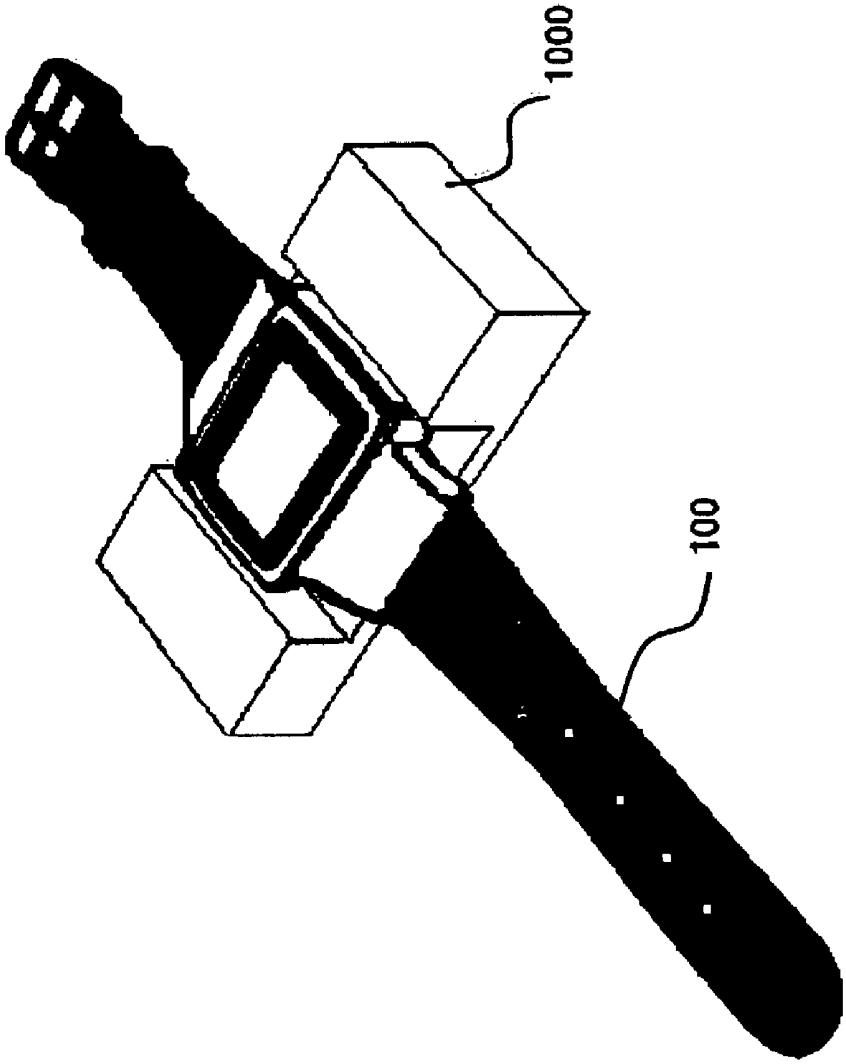



Fig. 6

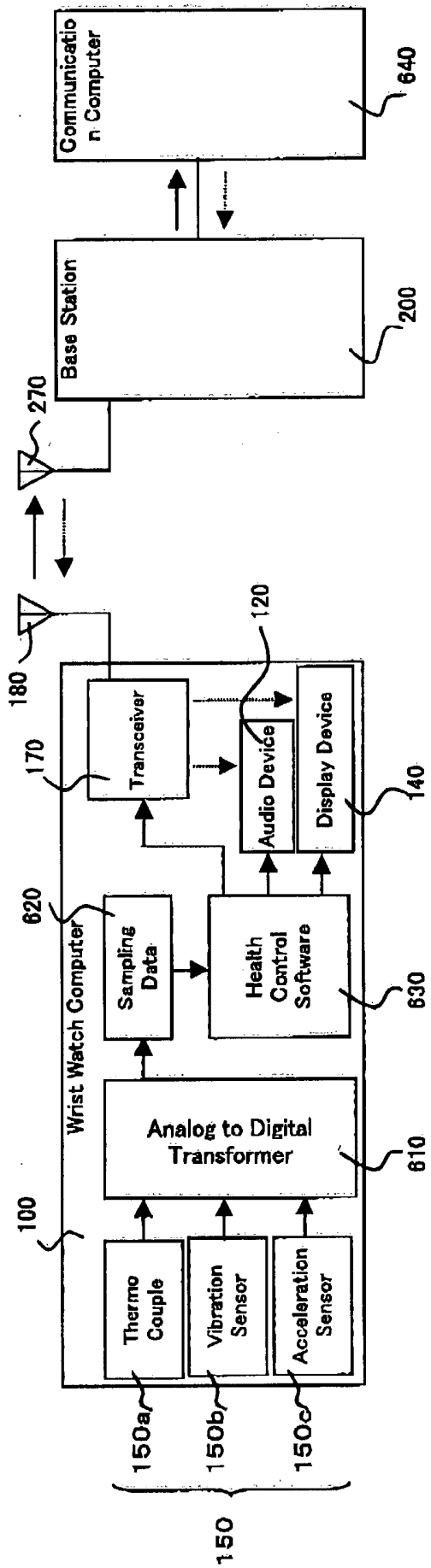

Communicatio n Computer
640
Base Station
200
270
180
120
170
Transceiver
Audio Device
Display Device
140
620
Sampling Data
Health Control Software
630
Wrist Watch Computer
Analog to Digital Transformer
610
100
Thermo Couple
Vibration Sensor
Acceleration Sensor
150a
150b
150c
150

Fig. 7

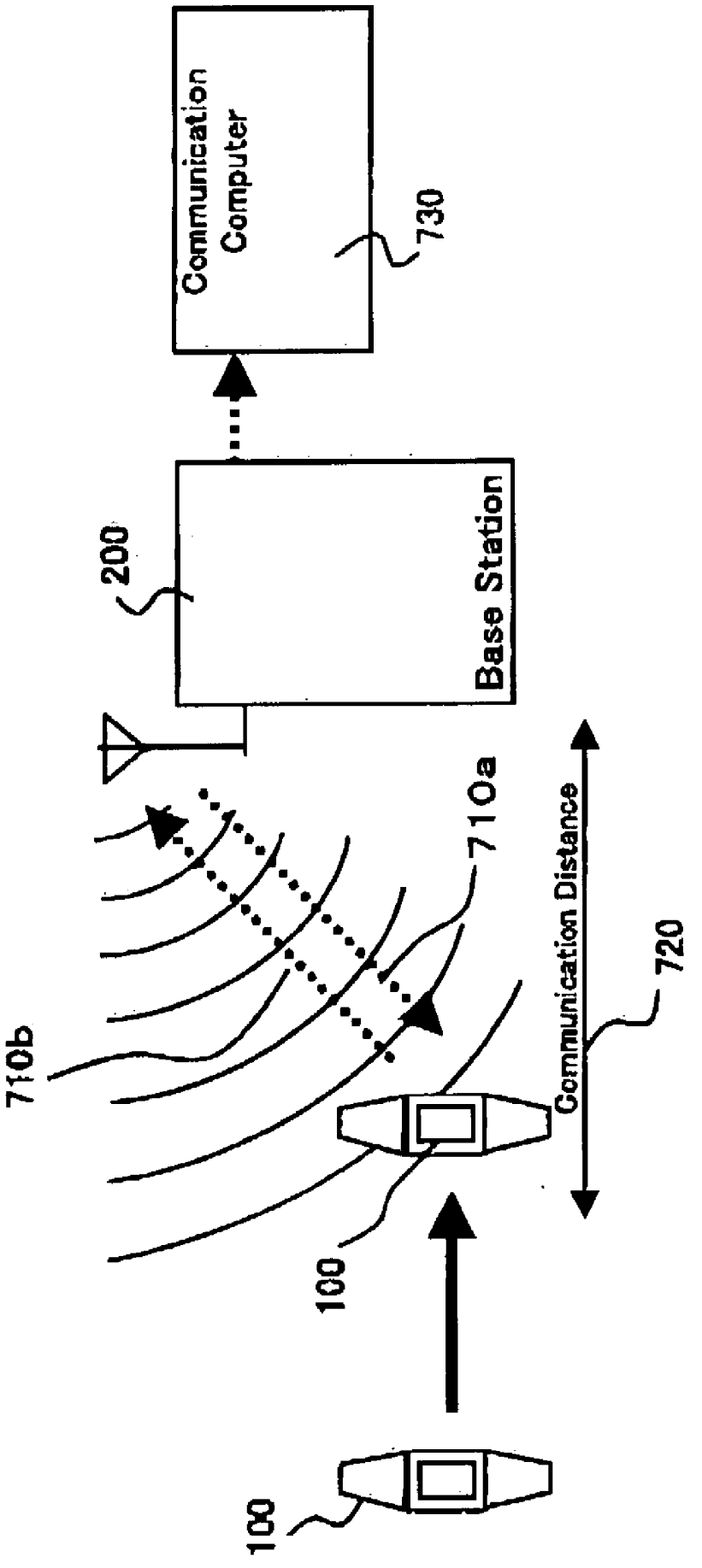

Communication Computer
730
200
Base Station
710a
710b
Communication Distance
720
100
100

Fig. 8

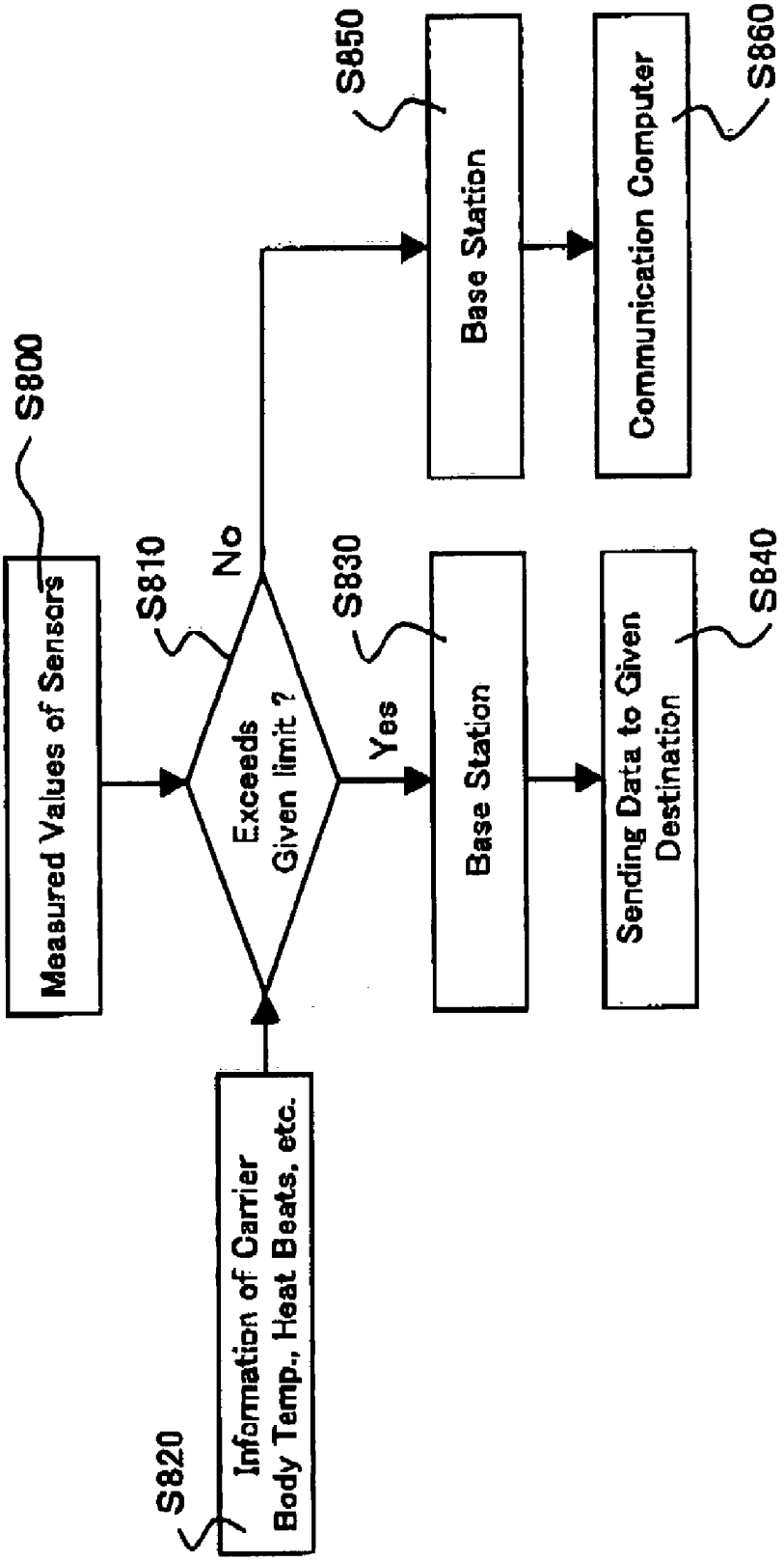
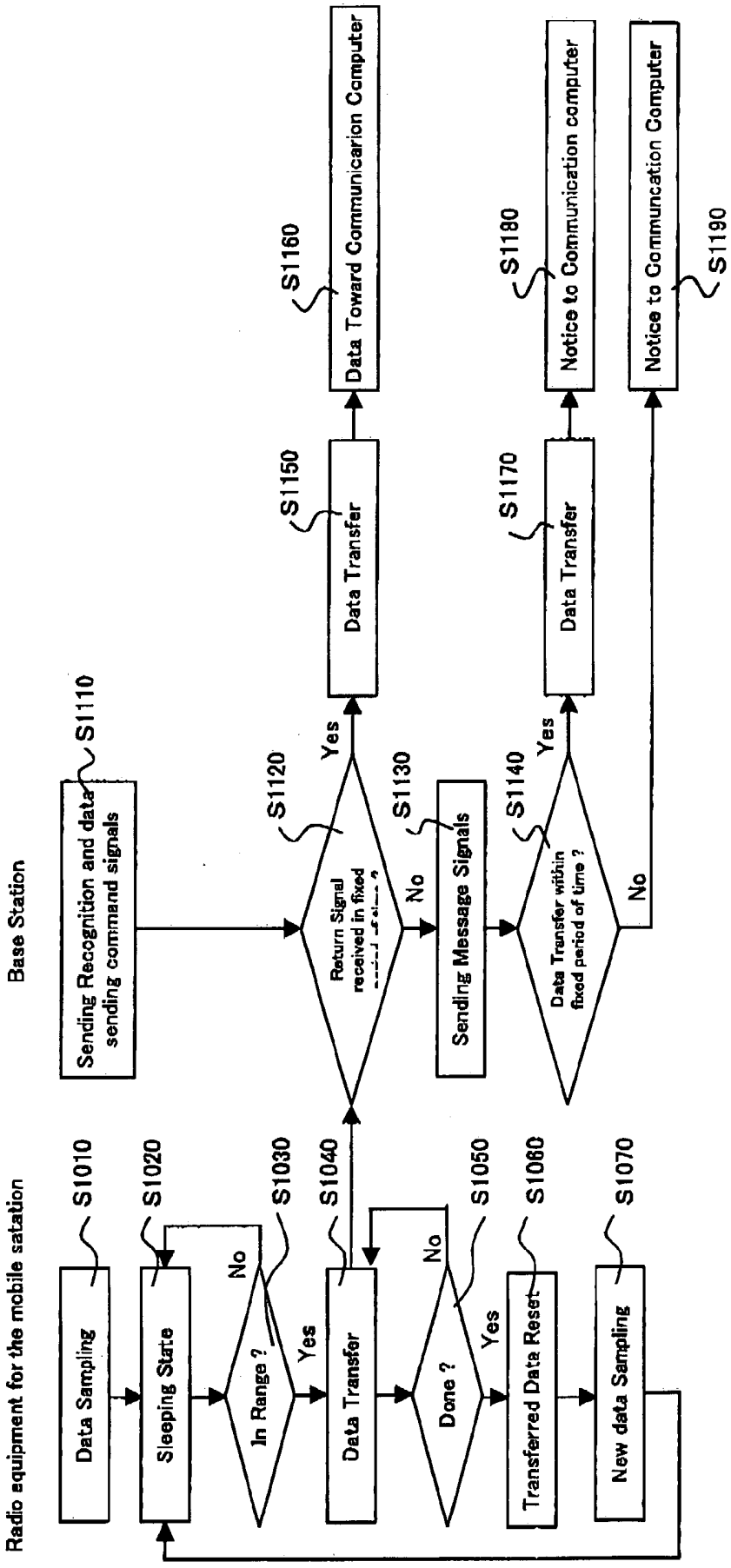

S800
Measured Values of Sensors
S810
Exceeds Given limit ?
No
Yes
S820
Information of Carrier Body Temp., Heat Beats, etc.
S830
Base Station
S840
Sending Data to Given Destination
S850
Base Station
S860
Communication Computer

Fig. 9

Fig. 10


Radio equipment for the mobile satation
Base Station
Data Sampling
S1010
Sleeping State
S1020
In Range ?
S1030
No
Yes
Data Transfer
S1040
Done ?
S1050
No
Yes
Transferred Data Reset
S1060
New data Sampling
S1070
Sending Recognition and data sending command signals
S1110
Return Signal received in fixed
S1120
Yes
No
Data Transfer
S1150
Data Toward Communicarion Computer
S1160
Sending Message Signals
S1130
Data Transfer within fixed period of time ?
S1140
Yes
No
Data Transfer
S1170
Notice to Communication computer
S1180
Notice to Communication Computer
S1190

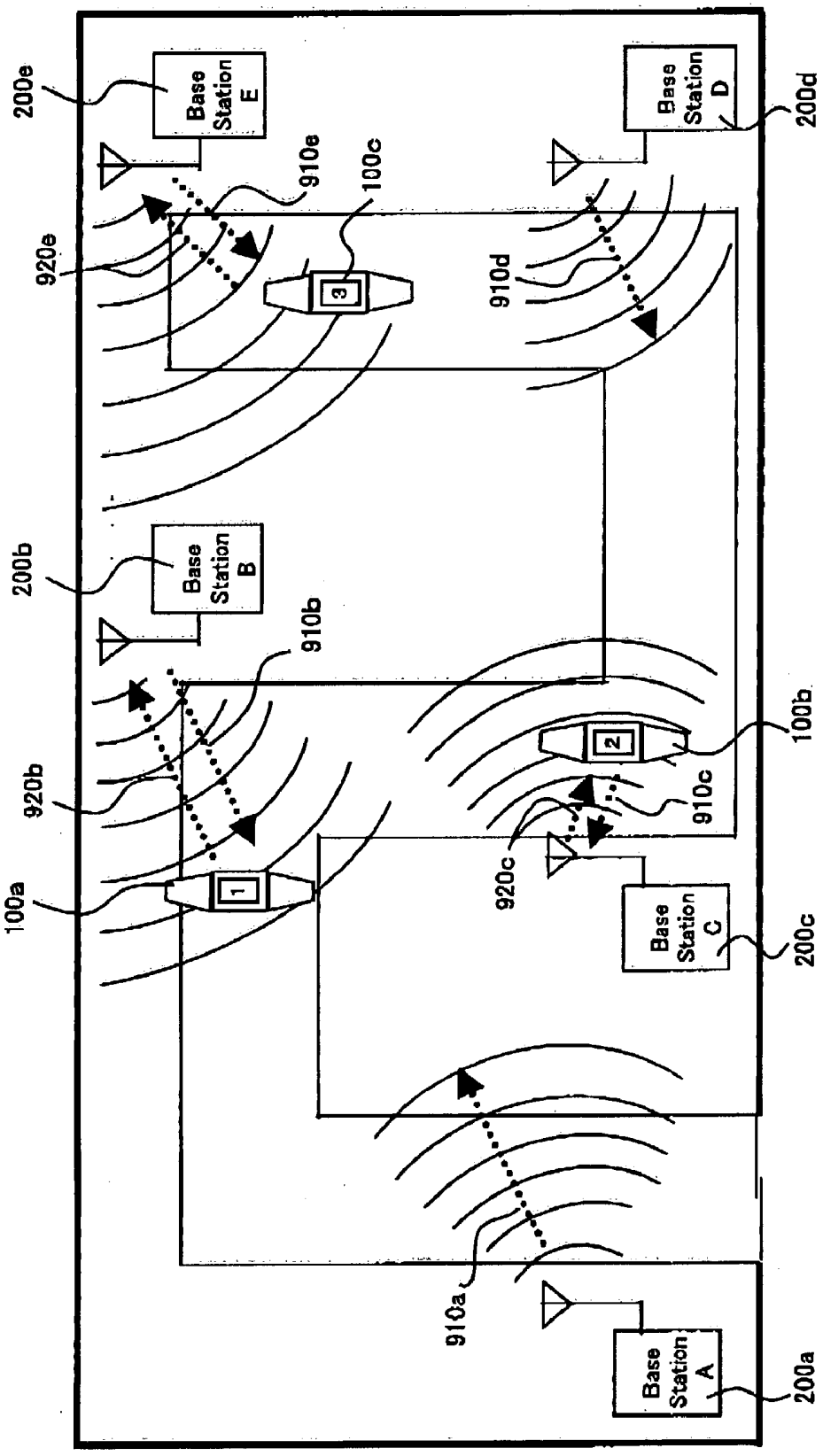

Base Station E
Base Station D
Base Station B
Base Station C
Base Station A
200e
200d
200b
200c
200a
910e
910d
910b
910c
910a
920e
920c
920b
100c
100b
100a
1
2
3

Fig. 11

# DATA TRANSFER SYSTEM

## BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] This invention belongs the field of the data transfer system that deals with the information of living organisms such as a human, a horse, a cow a, a dog, etc.

[0003] 2. Description of the Prior Arts

[0004] There exist a variety of communication methods that transfer the data of living organism through a mobile radio link. The most are the method that a mobile station actively emits the data and the immobile station receives the data transmitted by the mobile station. In other words the data emission is with very high power and reception of data is forced by high power emission, or existence of radio echo repeater between the emitter and the receptor helps the reception by means of data communication by passing the radio echo repeater, or existence of multiple receptors increases a chance of data reception. Frequently a mobile radio station is operated by a battery so that frequent change or recharging of the battery is forcefully required if the high power data emission is performed.

[0005] In order for a human to carry radio equipment the weight and the size of the radio equipment are limited. A radio equipment needs to be integrated in an item which the person who carried the radio equipment feels not the sense of incongruity. For example in the case of the radio equipment is integrated in a wrist watch the person may always carry the wrist watch because most of the wrist watch are water proof and there are no necessity to remove the wrist watch while bathing or work related to water. However, carrying on a hand, the battery has to be small and frequent change or recharging of battery is obliged if frequent radio communication is performed. The battery life of the radio equipment integrated in a wrist watch is determined by the transmission power, the frequency of the communication and transmission duration. For the application field of status grasping such as monitoring the status of elderly people it is a complicated task for an elderly person to change the battery or recharging battery frequently. In the other hand simply decreasing transmission power in order to minimize power consumption makes hard on the receptor to receive the data.

[0006] Moreover, in the case that the radio equipment is attached to the wrist, the polarization of radio wave emitted from the radio equipment on the wrist changes time to time when hands are moved during the transmission and reception because movement of the human hand is complicated. For the reception of direct wave change in polarization plane makes change in induced current on an antenna. In other words readability varies in function of time. For the reason the radio wave emitted from the mobile station may not be always reached to the immobile station with effective strength. This phenomenon causes a problem that the radio equipment of the immobile station may not receive the fact even if health status change occurred on the person who carries the mobile station.

## SUMMARY OF THE INVENTION

[0007] A data transfer system of this invention comprises a mobile station which is wared by a living organism for transmitting signals containing the information related to living activity of the living organism and an immobile station for receiving the signals from the mobile station, wherein the immobile station transmits a start signal to the mobile station in order to request the mobile station to start the data transfer, and the mobile station transmits the signals containing the information after receiving the start signal.

[0008] For the application of nursing care of elderly persons one month full of battery life is adequate. This application is basically the management of following two types. The first one is creation of monitoring system of everyday activity of living alone elderly person who has underlying disease or who is sick but shows healthy in his outlook, and the second is individual health management of a pool of elderly persons described for the first case. A computer integrated wrist watch coupled with low power radio features the mean of transmitting for a status monitor and the battery life can be extended with employment of devised transmission method. Systematizing the communication mean lets the creation of multi-purpose monitoring system with simple and low cost.

[0009] The data transfer system of this invention includes that, while the mobile station received the signal of information and then the signal is no longer received by the mobile station, the immobile station transmits the command for the mobile station to send the signals of information, and the mobile station receives the command and transmits the information related to the living organism based on the command.

[0010] The data transfer system of this invention deals with one of the information related with a living organism such as blood pulse, blood pressure, activity, body position and body temperature.

[0011] The data transfer system of this invention equips a radio system communicates with circular polarized radio wave.

[0012] The data transfer system of this invention equips the apparatus that is connected with the immobile station by means of either wired or wireless and receives the information from the immobile station and diagnoses the movement of the living organism.

[0013] The data transfer system of this invention equips the apparatus described above that transfers the commands to be ordered through the immobile station.

[0014] Simplifying the monitor system itself is a factor to reduce the cost. Recently, evolution of communication system lets a personal computer equips a modem for phone line in majority and the communication to outside becomes programmable.

[0015] In case that necessary communication could not establish because of uncertainty of radio communication the immobile station will inform the status to the predefined destination.

[0016] The data transfer system of this invention is, when the information about the living organism exceeds the boundary values that received from the immobile station, the mobile station informs the condition out of boundary values to the living organism. As uncertainty of radio communication and taking a consideration of the case where the content of emergency communication does not always get to the

destination, the sudden change of and danger in human health condition detected from the sampled human body index will be informed to the person who wear the mobile station.

## BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

[0017] A preferred form of the present invention is illustrated in the accompanying drawings in which:

[0018] **FIG. 1** is a basic configuration of the radio equipment of the mobile station;

[0019] **FIG. 2** is a basic configuration of the radio equipment of the immobile station;

[0020] **FIG. 3** shows the inter-communication between the radio equipment of the mobile station and the radio equipment of the immobile station;

[0021] **FIG. 4** shows the inter-reaction between the radio equipment of the immobile station and the communication computer;

[0022] **FIG. 5** show the antenna of the radio equipment of the mobile station and the antenna of the radio equipment of the immobile station;

[0023] **FIG. 6** shows at oblique perspective figure of recharging the radio equipment of the mobile station;

[0024] **FIG. 7** is an abbreviated figure of the health control system of the carrier of the radio equipment of the mobile station;

[0025] **FIG. 8** is a pattern diagrams of the inter-reaction between the radio equipment of the mobile station and the radio equipment of the immobile station;

[0026] **FIG. 9** is aflow chart showing the execution of life information of the carrier of the radio equipment of the mobile station;

[0027] **FIG. 10** is a flow chart showing the inter-reaction between the radio equipment of the mobile station and the radio equipment of the immobile station; and

[0028] **FIG. 11** is a figure of radio communication between the radio equipment of the mobile station and the radio equipment while multiple existences of the immobile radio station.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

### Embodiment 1

[0029] Explaining the data transfer system of this invention with figures. **FIG. 1** shows the basic block diagram of mobile radio equipment to be a mobile station. Mobile radio equipment **100** is attached a part of a living organism. For example an arm for a human and legs or neck for a cow are place of attachment. In this embodiment the explanation is based on when a human wear the mobile station on his arm.

[0030] The basic structure of the mobile radio equipment **100** is comprised the wrist watch-type computer **110**, sensor units to measure the information of the human body or the environment the human is located, a power unit **160**, a transceiver unit to make a communication with the immobile station, and an antenna for transmission and reception.

[0031] The wrist watch-type computer **110** is comprised a sound unit **120**, data memory unit **130**, a display unit **140**. The sound unit **120** may ask the person (carrier) who wearing the mobile radio equipment **100** a question such as feeling of current human body condition. Moreover, the sound unit **120** may emits non-human sound such as an alarm. The data memory unit **130** stores the health management software that is programmed along the carrier's health condition. Moreover, the data memory unit **130** stores the information of the carrier and the sampled values measured by the sensor units **150**. The display unit **140** displays the content of a question to ask the carrier or a command to indicate to the carrier. It is possible for the display unit **140** and the sound unit **120** to function together for the display and the sound together or combining these two functions.

[0032] The sensor units **150** have a function of sensing the information of living organism. The information of living organism that is been sensed is sent to the wrist watch-type computer **110**. The power unit **160** supplies electrical power to the computer integrated in a wrist watch **110**, sensor units **150** and the transceiver unit **170**. The transceiver unit communicates with the bases station indicated in **FIG. 2**, and transmits the information of the carrier saved in the data memory unit **130** and receives the information need to be transferred to the carrier. The antenna **180**, coupled with the transceiver unit **170**, propagates radio wave into the atmosphere.

[0033] The sensor units **150** in the wrist watch-type computer **110** combined into the mobile radio equipment **100** reads the information of the carrier or the environment that the carrier is located under the given condition. The information read out is sent to the wrist watch-type computer **110**. The information has been sent is stored in the data memory unit **130** in the wrist watch-type computer **110** with time information. The wrist watch-type computer **110**, using the preinstalled health management software, when most recent information is out of the boundaries defined in the health management software, the wrist watch-type computer **100** will inform, using the display function and announcing function by voice and sounds, the status of out of boundary to the carrier who weak the mobile radio equipment **100**. In the same manner the transceiver **170** receives the report sent toward the mobile radio equipment **100**.

[0034] **FIG. 2** shows the basic block diagram of the immobile base radio equipment. The radio equipment **200** of the immobile station is comprised the immobile station circuit **280** and the antenna **270**. The radio equipment **200** of the immobile station is, connecting the out door communication network, sending the data with the defined protocol from the communication interface **240** to either wired or wireless mean, connected to the communication computer. Then, the radio equipment **200** of the immobile station exchanges many types of data with the communication computer. The radio equipment **200** of the immobile station is powered by connecting with the power supply unit **250**. The immobile station circuit may equip high capacity rechargeable battery.

[0035] The immobile station circuit **280** is comprised a communication interface **240** to connect with the outdoor communication network, the central processing unit **230** to

perform calculations, the communication control circuit **210** to control communication traffic, the transceiver **220** to communicate with the radio equipment of the mobile station, and the antenna.

[**0036**] The communication interface **240** is an interface based either on LAN (Local Area Network) specification or on the popular protocol for a modem. The central processing unit **230** controls over the exchange of marks through the communication interface **240** or manages the exchange of data between the radio equipment of the mobile station. The transceiver **220** establishes bi-directional communication with the radio equipment of the mobile station. The antenna **270**, connecting with the transceiver **220**, propagates radio wave to the atmosphere.

[**0037**] **FIG. 3** indicates the exchange of marks between the radio equipment **100** of the mobile station and the radio equipment **200** of the mobile station.

[**0038**] The radio equipment **100** of the mobile station is located the point selected where the carrier who carries the radio equipment **100** of the mobile station goes by frequently.

[**0039**] The radio equipment **200** of the immobile station transmits, with defined interval but continuously, the transmission command **310***a* toward the base radio equipment **100** of the mobile station. The radio equipment **200** of the immobile station keep watching weather the radio equipment **100** of the mobile station is within the communication range **320** or not. If the radio equipment **100** of the mobile station is not within the communication range **320** with the radio equipment **200** of the immobile station, the radio equipment **100** of the mobile station remains under sleeping status or simply the current time is displayed on the display unit **140**. If the radio equipment **100**, in the other hand, is within the communication range **320** with the radio equipment **200** of the immobile station, the radio equipment **100** of the mobile station sends the reply signal **310***b* to the radio equipment **200** of the immobile station when the radio equipment **100** of the mobile station received the transmission command **310***a* from the radio equipment **200** of the immobile station. The reply signal **310***b* contains the different data of the carrier stored in the data memory unit **130** such as the information of the living organism or the environment the living organism is located.

[**0040**] **FIG. 4** shows the communication relation between the radio equipment of the immobile station and the communication computer **400**. The radio equipment **200** of the immobile station is connected with the communication computer **400** by wired and/or wireless means toward the outdoor communication network. The radio equipment **200** of the immobile station stores the information of the carrier or the environment that the carrier is located. Such information will be sent **410** to the communication computer **400**. The radio equipment **200** of the immobile station, including the time and the fact that the communication is established with the communication computer **400**, transfer the information received to the communication computer **400**. The communication computer **400** analyses the activity and the ecological movement of the carrier based on the data received. While the transfer of data, the destination of transfer and the nature of data to be sent are reregistered and by the defined method the defined information can be transferred through the public communication mean. If the carrier indicates abnormal activities or if his physical condition is distorted, the communication computer **400** may send the data to limit the activity of the carrier and the question related to his health to ask the carrier.

[**0041**] As referred, the radio equipment **100** of the mobile station, the radio equipment **200** of the immobile station and the communication computer **400** serves, for example, as a health management system for a patient who has underlying disease but who can live a normal life, and a system to confirm the safety of an elderly person, especially the elderly person who lives alone. The system referred above also serves as the continuous watching system in a house the target person lives in, in a hospital or an old person home.

[**0042**] FIGS. **5** show the radio antennas of the radio equipment of the mobile station and the radio equipment of the immobile station. **FIG. 5A** shows the radio antenna of the radio equipment of the immobile station. The antenna **510** is located on the top of the radio equipment **200** of the immobile station and has a shape of a cross. The impedance matching method for the radio antenna **510** is gamma-matching method. The antenna is comprised 90 degree crossed 2 metal rods of half lambda of wavelength and is fed through the gamma rod. The phase between 2 feeding points is set at 90 degrees and two feed points are fed in 90 degrees in phase by using a signal delay line.

[**0043**] **FIG. 5B** shows the antenna of the radio equipment of the mobile station. The radio antenna **510** of the radio equipment **100** of the mobile station ideally should be the same as the one for the radio equipment **200** of the immobile station. If the radio equipment **100** of the mobile station has the shape of the wrist watch-shaped radio equipment, the wiring position has to be selected taking a consideration of efficiency of the antenna and the wrist watch shape. For the radio equipment **100** of the mobile station the 4 wires of the antenna **520** stick out from the center is placed along the watch band. The place of antenna should be the point where away for the body of the living organism as much as possible. The body of the living organism acts as the radio frequency ground. For the reason it is very important that the antenna position should be away from the body of the living organism in order to avoid the effect of the ground. The phase difference of two wires of antenna is the angle of two wires from the center to the edge of the band.

[**0044**] **FIG. 5C** shows schematic of the antenna of circular polarization. **FIG. 5D** shows the directivity of circular polarization. Upon a communication the radio equipment **200** of the immobile station is obliged to receive surely the content transmitted from the radio equipment **100** of the mobile station. If the polarization plane is fixed either in vertical or in horizontal, the relative polarization plane between the sender to the receiver the current induced on the antenna **510** of the radio equipment **200** of the immobile station may vary and ill recovered portion of the information may appear because of the phenomenon. For the reason this embodiment indicates, rotating the polarization plane, it makes possible to minimize the reception strength variation. For the case of circular polarization the speed of rotating the polarization plane is directly related to the frequency of the radio wave in use. Therefore, the speed of the rotating polarization plane is much faster than the movement of the human arm. Thus, radio wave of the uniform field strength is emitted even if the arm of the carrier of the radio equipment **100** of the mobile station varies its position.

[0045] **FIG. 6** is a schematic of charging the radio equipment of the mobile station. In order to maintain the function of the radio equipment **100** of the mobile station the inevitable action is the recharging the radio equipment **100** of the mobile station. Against the radio equipment **200** of the immobile station that has the function of the immobile station, the radio equipment **100** of the mobile station acts passive, and responds only when two radio equipments are within communication range, and has the effect to save the power consumption while the transmission. Except while performing the defined action the radio equipment **100** of the mobile station remains asleep so that a battery is sufficient power source to operate it. In this embodiment recharging frequency is resulted once a month at most. The recharging method is simply placing the radio equipment **100** of the mobile station on the battery charger **1000**. A home help may recharge easily the radio equipment **100** of the mobile station. The recharging duration is sufficient enough for several hours. For the reason the length of time while a home help gives a care to the carrier of the radio equipment **100** of the mobile station may be enough duration for recharging if the home help take an action of recharging. If recharging action does not takes place and the radio equipment **100** of the mobile station lost the function of transmission, the radio equipment **200** of the immobile station recognizes as the carrier of the radio equipment **100** of the mobile station does not go through the point he usually goes through. Such condition is considered to be an abnormal status so that the communication computer **400** informs the report of the abnormal status to the pre-registered emergency destinations. Then, the persons at the emergency destination or the related persons may find the fact either simply forgets of recharging or that there happened a situation that the carrier was unable to perform recharging action.

Embodiment 2

[0046] **FIG. 7** shows the diagram of the health control system for the carrier. This system is comprised the radio equipment **100** of the mobile station ware by a carrier, the radio equipment **200** of the immobile station that is located the point the carrier passes through frequently. And the communication computer **400** that holds the information of the carrier.

[0047] The radio equipment **100** of the mobile station uses the wrist watch-shape computer in order to acquire the index of the human body and that of the status of the environment that the carrier is located. The sensors integrated in are consider ed to be in many different types. In these embodiment three types of sensor, as the sensor units **150**, the thermo couple **150***a*, the vibration detector **150***b*, the acceleration sensor **150***c* are used. The thermo couple **150***a* measures the body and ambient temperatures. The vibration detector **150***b* measures the rate of blood pulse. The acceleration sensor **150***c* detects the activity of human body. The values coming out of each sensor **150***a*, **150***b* and **150***c* are in the form of analog signal so that the values have to be digitalized by using the analog to digital transformer **610**. The digitalized values are sent to the sampling data circuit **620** and are treated as the sampled data. The sampling data circuit **620** stores the sampled data.

[0048] The watch shape computer **100** reads the values of the sensor **150***a*, **150***b*, and **150***c*. Other than memorizing these values after digitalizing the watch shape computer **100** equips the health control software (software) **630** that evaluates the health status of the carrier of the watch shape computer. The health control software **630** of the watch shape computer has the lower and higher boundaries for the body temperature, the ambient temperature, the blood pulse rate and the activity status that are sampled, These boundary values are compared with the sampled values if these values exceed either higher or lower boundary. If the sampled value obtained by exceeds either boundary, which means the sampled value goes higher than the lower boundary or goes lower than the lower boundary, the display unit **140** displays the caution statement based on the content of the index to the carrier. And the caution is submitted from the audio unit **120**. Either the display unit **140** or the audio unit **120** is in use depending upon the content of the notice or the both can be used at the same time or one which is more adequate can be used. For example the display show the message "Please stop the hard exercise" when the measured activity exceeds the upper boundary of the index. The audio function announces "Caution High body temperature. Please make a contact with your doctor" if the measures body temperature exceeds the upper boundary for more than a half day period of time. The carrier of the watch shape computer **100** who got the warning from the watch shape computer **100** will become possible to take an adequate action by himself. The information acquired by execution the health control software is transmitted on the air from the antenna **180** in the form of radio frequency through the transceiver **170**. The antenna **270** of radio equipment **200** of the immobile station as the base station receives the information. The information received will be analyzed by the radio equipment **200** of the immobile station or by the communication computer **400** directly or indirectly connected the public communication network. And then necessary instruction is given to the carrier of the radio equipment **100** of the mobile station based on the result of the analysis. The content of the analysis done by the communication computer **400** will be sent toward the radio equipment **200** of the immobile station and then toward the watch shaped computer **100** from the radio equipment **200** of the immobile station. The radio equipment **100** of the mobile station receives the content and the watch shaped computer displays the message sent to the radio equipment **100** of the immobile station on the display unit **140** also with the message in audio form. For example the message such as "Hello How are you ?"" or the request such as "Please call following phone number."

[0049] The characteristic of this embodiment is the immediate notice or caution to the carrier of the radio equipment **100** of the mobile station based on the diagnostics the health control software is allowed to do. And the watch shape computer has a capability to inform the messages and instructions coming from outside of the watch shaped computer by display or audio.

[0050] **FIG. 8** indicates the inter-reaction between the radio equipment of the mobile station and the radio station of the immobile station.

[0051] The radio equipment **200** of the immobile station works as the base station sends **710***c*, toward the radio equipment **100** of the mobile station continuously with short interval of time, the signal of acknowledging the radio equipment **100** of the mobile station and a command to send its data. The radio equipment **100** coming across the radio equipment **200** of the immobile station sends **710***b* the data

in the predefined format toward the radio equipment **200** of the mobile station when the radio equipment **100** of the mobile station comes into the communication range to the radio equipment **200** of the immobile station. The radio equipment **100** of the immobile station transfers the received data to the communication computer **400** through the wired or radio means. The radio equipment **100** of the mobile station after confirming the data reception by the radio equipment **200** of the immobile station will reset only the data transferred and the new acquisition of data takes place. For the case of this embodiment the radio equipment **100** wakes up from the state of sleep after reception of radio frequency of the radio equipment **200** of the immobile station and the radio equipment **100** of the mobile station goes back into the sleeping state after all the assigned work has bee done. The radio equipment **100** of the mobile station does not perform radio transmission actively so that it is possible to conserve the power of the battery in the radio equipment **100** of the mobile station.

[**0052**] **FIG. 9** shows the flow chart to analyze the information of life activity of the carrier of the radio equipment **100** of the mobile station. The information of life activity is collected by using the sensor units equipped on the radio equipment **100** of the mobile station. (**S800**) The sampling by sensors should be done in sequence of time. The watch shaped computer keeps pre-acquired personal data of the carrier such as the range of his body temperature and blood pulse rate, or the index boundary of other root disease. The watch shaped computer in the radio equipment **100** of the mobile station determines whether the values of the carrier sampled by the sensor units **150** exceeds either upper or lower boundary. (**S810**) For the case not exceeding the boundary value the radio equipment **100** of the mobile station simply informs the result of determination toward the radio equipment **200** of the immobile station. (**S850**) The communication computer **400** analyzes the same content. (**S860**) In the other hand for the case exceeding the boundary value firstly the result of the determination will be set to the radio equipment **200** of the immobile station and then all the data will be sent or/and a call will be made to the pre-registered destinations (address). The address can be that of his doctor, member of his family, his relatives, his home helps, etc. A common or public mean of data transfer is adequate for this case of data transfer. In this embodiment the data has been sent to the destination by using email or facsimile capability of a personal computer. For the case the destination is his doctor his doctor can take an immediate action by looking at the sampled values and their boundary values. When the doctor send a message to his patient as the carrier of the radio equipment **100** of the mobile station, his message can goes by the opposite pass from where the data came. His message can be displayed on the display unit of the radio equipment **100** of the mobile station. This method of the data transfer is effective when the advance of disease is slow or when some kind of indication is shown before the actual indication of the disease shows up.

[**0053**] **FIG. 10** shows the flow chart of the inter-reaction between the radio equipment **100** of the mobile station and the radio equipment **200** of the immobile station. The radio equipment **100** of the mobile station acquires the life information of the carrier by using the sensor units **150**. (**S1010**) The radio equipment **100** of the mobile station finishes acquiring data goes into the sleeping state. (**S1020**) If the radio equipment **100** of the mobile station is within the communication range with the radio equipment **200** of the immobile station, the radio equipment **100** of the mobile station transfers the data to the radio equipment **200** of the immobile station. (**S1040**) The data to be transferred are the body temperature, the ambient temperature, blood pulse rate, etc. The data transfer will be continued (**S1050**) until data transfer is completed. (**S1040**) When data transfer is completed (**S1050**), then the data already transferred will be cleared. (**S1060**) Clearing the already transferred data makes more memory space for the upcoming data so that for even a small size memory the data can be collected and stored efficiently. After clearing already transferred data new data sampling takes place. (**S1070**) After sampling the radio equipment **100** of the mobile station goes back to the sleeping state (**S1010**) for conservation of power.

[**0054**] Once the radio equipment **200** of the immobile station recognizes the existence of the radio equipment **100** of the mobile station within the communication range, the radio equipment **200** of the immobile station sends a command to request data to the radio equipment **100** of the mobile station. (**S1100**) Then, the radio equipment **200** of the immobile station checks whether existence of an indication of data transfer from the radio equipment **100** of the mobile station or not. (**S1120**) If the data is received from the radio equipment **100** of the mobile station, the data received will be sent to the communication computer **400**. (**S1150**) The data will be analyzed by the communication computer **400**, and then the communication computer **400** prepares the instructions and/or the warning upon the necessity. (**S1160**)

[**0055**] In the other hand if no indication of data transfer from the radio equipment **100** of the mobile station, the radio equipment **200** of the immobile station send a message signal. (**S1130**) The radio equipment **200** of the immobile station determines whether existence of the indication of data communication from the radio equipment **100** of the mobile station within the predefined period of time or not after sending the message signal. (**S1140**) If the data communication is established within the predefined period of time, the radio equipment **200** of the immobile station sends forward the received data to the communication computer **400**. (**S1170**). The communication computer **400** analyzes the forwarded data and the communication computer prepares the instructions and/or warnings upon necessity. (**S1160**) When no data communication is established within the predefined period of time, the fact of no communication is sent to the communication computer **400**. (**S1190**) The communication computer commands to send the message of the pre-defined format to the pre-registered destination. Basically the radio equipment **200** of the immobile station that has a function of the base station is installed at where the carrier of the radio equipment **100** of the mobile station frequently passes through such as the bathroom, the kitchen, the living room, etc.

[**0056**] The fact that the carrier of the radio equipment **100** of the mobile station does not pass through such the place means the activity of the carrier is different from the usual. For such a case the situation of the carrier can be imagined is, for example, whether the carrier became physically disabled because of breaking bones or the case of wandering for the person looks normal but having underlying dementia. For the latter case the area in distance for the person moved has a relation with difference in time from the moment the person's absconding. If the moment of the person's

absconding is determined, it helps to determine the area in distance to look for him. The importance of this embodiment is to summarize the information related to the human activity and the environment the individual is located just for a person wearing the radio equipment **100** of the mobile station passing through the specific location where the radio equipment **200** of the immobile station is located.

Embodiment 3

[**0057**] **FIG. 11** indicates the radio communication between the radio equipment **100** of the mobile station and the radio equipment **200** of the immobile station where multiple immobile stations are installed. At the former embodiment the explanation has been made for the case of one radio equipment **100** of the mobile station and one corresponding radio equipment **200** of the immobile station that has a function of health monitoring system for an elderly person who lives alone or a patient who has underlying diseases. Under the existence of multiple radio equipments **100** of the mobile station and multiple radio equipments **200** following application is possible. FIG. **11** shows the pictorial example of this embodiment,

[**0058**] This embodiment is executed under the condition that the radio equipment **100** of the mobile station has an identification number and a patient wearing the radio equipment **100** of the mobile station within a facility such as a hospital. The base stations, the five immobile stations numbered from A**200***a* through A**200***e*, are installed on such a place like a wall of a corridor. For the case of the radio equipment **200** of the immobile station **200***a* the radio equipment **200***a* of the immobile station sends the recognition signal **900***a* to the radio equipment **100** of the mobile station. When the radio equipment **100** of the mobile station wore by the patient is out of communication range with the radio equipment **200***a*, the radio equipment **200***a* is not possible to receive the data. For the case of radio equipment **200***b* of the immobile station the radio equipment **200***b* of the immobile station sends the recognition signal **910***a*. The radio equipment **100** of the mobile station that has the identification number 1 is within the communication range with the radio equipment **200***b* of the immobile station so that the radio equipment **100** of the mobile station transfers (**910***b*) the data acquired in the radio equipment **100** of the mobile station to the radio equipment **200***b* of the immobile station. The data transferred to the radio equipment **200***b* of the immobile station will be sent forward the communication computer not shown on **FIG. 11**. For the case of the radio equipments **200***c* and **200***e* the recognition signals **910***c* by **200***c* and **910***e* by **200***e* will be sent. The radio equipment **100***b* of the mobile station that has its identification number 2 performs data transfer **920***c* to the radio equipment **200***c* and the radio equipment **100***c* of the mobile station that has its identification number 3 performs data transfer **920***e* to the radio equipment **200***e* of the immobile station as well. The each data transferred from either the radio equipments **200***c* or **200***e* of the immobile station will be sent the communication computer **400** not shown on **FIG. 11**. For the case of the radio equipment **200***d* of the immobile station the radio equipment **200***d* sends the signal (**910***d*) to recognize the radio equipment **100** of the mobile station.

[**0059**] As shown above, the life data an the environmental data of the specific patient can be acquired by one of multiple installation of the radio equipment **200** of the immobile station. In addition the installation location of the radio equipment **200** of the immobile station tells the current location of the patience in the hospital.

[**0060**] Therefore, a message or an instruction can be sent to the specific patient. For example a message or an instruction is sent to the patient who wears the radio equipment **100***a* by passing the radio equipment **200***e* of the immobile station. The content of the message or instruction is displayed on the display unit of the radio equipment wore by the specific patient so that the message or the instruction can be sent only the patient of the destination. If the content of the message or the instruction is related to the privacy of the specific patient, the advantage of this system is large.

What is claimed is:

**1**. A data transfer system comprising:

a mobile station which is wared by a living organism for transmitting signals containing the information related to living activity of the living organism; and

an immobile station for receiving the signals from the mobile station;

wherein the immobile station transmits a start signal to the mobile station in order to request the mobile station to start the data transfer, and the mobile station transmits the signals containing the information after receiving the start signal.

**2**. A data transfer system according to claim 1;

wherein the immobile station transmits signals of commands toward the living organism to the mobile station during the period of time, and the immobile station first received the information signal of the mobile station until no reception for the immobile station of the information signal, and that the mobile station receives the signals of commands toward the living organism and executes the command toward the living organism based upon the content of the command signals.

**3**. A data transfer system according to claim 1;

wherein the information related to living activity comprisesat least one of blood pulse rate, blood pressure, body action, situation and body temperature.

**4**. A data transfer system according to claim 1;

wherein the mobile station and the immobile station make communication with the radio wave of circular polarization.

**5**. A data transfer system according to claim 1, further comprising:

an equipments that distinguishs the nature of living activity of the living organism by receiving the information of the living activity from the immobile station.

**6**. A data transfer system according to claim 5,

wherein the equipment transfers the command toward the living organism to the mobile station by passing the immobile station.

**7**. A data transfer system according to claim 5,

wherein the immobile station will inform the absence of communication with the mobile station to the predefined destinations if no communication is established between the immobile station and the mobile station within the predefined period of time.

**8**. A data transfer system according to claim 6;

wherein the mobile station informs the conditions that the sampled values which imported from the immobile station measured upon the living organism become out of the predefined ranges to the living organism, when the sampled values measured upon the living organism become out of the predefined rangesl.

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摘要(译)

提供以低功耗执行发送和接收的数据传送设备。移动台的无线电设备由生物体佩戴并收集与生物有关的信息。收集的与生物体有关的信息被转换成信息信号并被发送到固定站的无线电设备。固定站的无线电设备从移动站的无线电设备接收信息。当移动台的无线电设备将之前描述的信息发送到移动台的无线电设备时，移动台的无线电设备发送用于移动台的无线电设备的命令以开始发送信息。当无线电设备接收到命令时，移动台的无线电设备开始发送包含该信息的信号。