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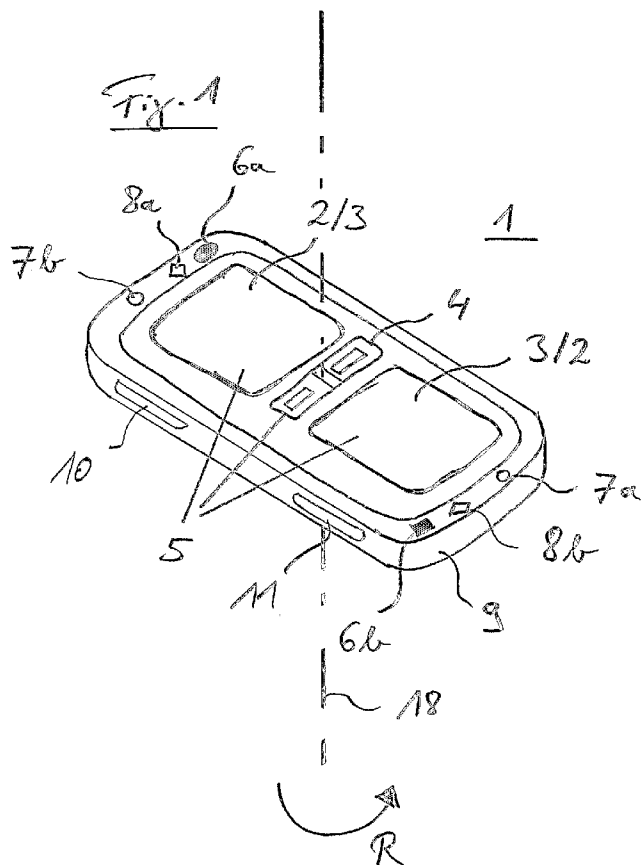
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(54) Title: WIRELESS COMMUNICATION DEVICE AND METHOD FOR COMMUNICATING WITH TWO DIFFERENT
COMMUNICATION CHANNELS



(57) Abstract: The present invention relates to a wireless communication device (1) and a method for communicating with at least two communication modules for establishing communication with at least one communication network (15) based on different network access information, wherein a switching device (16) for detecting an orientation and/or an activation mode of the communication device (1), at least one user interface (5), having a display functionality for displaying information and an input functionality for inputting information and a controller (14) are cooperating in such a way that the active communication module (12, 13) is connected to the user interface (5) by determining the active communication module throughout such detection of the orientation and/or the activation code of the communication device. Preferably, the communication device is a mobile phone with a touch screen which is switchable between the functionalities of a display and a key pad, depending on the activated communication module.

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Description

The present invention relates to a wireless communication device and method for switching between communication modules in a wireless communication device for establishing communication with at least one communication network, based on different network access information and to the use of such wireless communication device in accordance with independent claims 1, 11 and 14, wherein a preferred communication device of the present invention is a mobile phone.

The preferred type of the present invention is a communication device with a housing, having at least two communication modules for establishing communication with at least one communication network, thereby comprising a user interface with a key pad and a display as well as a controller with a radio communication unit for communicating data, such as speech, pictures or information via a wireless communication network to another user of such wireless communication network. More specifically, the present invention relates to a mobile phone which is able to communicate with one or more other users of a mobile telephone network in a certain communication mode, e.g. a GSM mobile phone, being able to communicate via a certain radio frequency in a mobile

telephone network relating to a certain provider and in accordance with a certain telephone number.

Such wireless communication devices are nowadays widely known and used in the market. Users are using these mobile phones for private or business purposes with publically known or secret telephone numbers as well as in various networks and by use of different mobile service providers. Such mobile phones as modern communication means have become an ubiquitous tool for both personal and work related tasks throughout the world. GSM (Global System for Mobile Communications) based cellular phones are very popular. However, the known mobile phones work with a certain activation unit such as a SIM card which enables the user of a mobile phone to be connected to a certain mobile network throughout the services of a certain mobile service provider thereby having a certain telephone number which is associated with the activation unit. If the user of such mobile phone would like to use the mobile phone for another purpose such as for private purposes, while it has been used for business purposes before, the user must exchange the SIM card in his mobile phone in order to be able to use another telephone number, another telephone network and/or another telephone provider. By doing so the user is obliged to remove the prior SIM card, to insert a new SIM card and to reboot his mobile phone which is then activated again to be used in a different communication mode.

EP 0 821 537 A2 (Nokia Mobile Phones Ltd.) discloses a communication device which serves a dual function as a pager or a cellular phone. Selection between the dual functions is controlled by the user of the mobile station who may choose to operate the mobile station in either the cellular mode or the

pager mode. When in the cellular mode the mobile station can roam, make calls to the system and receive calls from the system. When in pager mode the mobile station does not receive calls from the system but instead receives only paging messages.

US 6,714,802 (Ericsson) discloses a wireless communication device with a main apparatus housing, a first user interface with a first key pad and a first display as well as a second user interface with a second keypad and a second display wherein the second keypad and the second display are detachably connectable to the main apparatus housing of the portable communication apparatus. Such second user interface is provided for text messages such as SMS (Short Messages Services in GSM) where a user of a telephone may generate a text message containing a predetermined maximum number of alpha numeric characters and then send it across the mobile telephone network to an intended receiver. Since the standard keypad in an ordinary mobile phone is too small, US 6,714,802 proposes to have a larger second keypad -such as a type writer keyboard- in order to facilitate the entry of text messages.

US 2003/006 0195 discloses a dual-mode telephone with a satellite communication adapter wherein a regular cellular-type hand portable phone is equipped with a connector for a satellite communication adapter accessory access to the handset's signal processing recourses which enables the user to operate in an alternative mode to process signals received from the satellite and converted by the adapter into a suitable form for processing in the mobile phone.

However, none of the know devices enables the user of such wireless communication device to use the same device for more than one purpose at the same time that means that none of the prior art devices is activated simultaneously in two different communication modi so that the user is able to receive or transmit speech, pictures or data simultaneously via two different networks or two different telephone lines or by use of two different telephone numbers. In order to have such functionality users nowadays use two mobile phones, each equipped with one SIM card which activates a respective communication module in each of the communication devices which can then both be used at the same time.

It is therefore the object of the present invention to provide a communication device for wireless communication purposes which is able to operate in at least two different communication modi simultaneously, so that the user of such wireless communication device is able to operate such device e.g. via two different wireless telecommunication networks or by using two different radio frequencies or by using two different telephone numbers without the necessity to carry around two different mobile phones.

Another object of the present invention is to provide a wireless communication device which is more flexible then the prior art devices. More specifically, the communication device should appear compact in size, having a low weight and a low power consumption and should be usable by a regular mobile phone user without the necessity to read large instruction manuals, so the device should be usable instantaneously and intuitively.

The above objects are solved by the invention throughout the features of independent claims 1, 11 and 14. Further features and advantages of the invention are characterized and claimed in the subclaims.

The wireless communication device of the present invention comprises a housing which has at least two communication modules for establishing a desired communication with at least one communication network, based on different network access information provided by each of the at least two communication modules (e.g. through a SIM-card which is connected to such communication module).

The present invention furthermore comprises a switching device for detecting the orientation and/or an activation mode of the communication device, as well as at least one user interface which shows display functionality for displaying information and an input functionality for inputting information. A controller determines an active communication module in cooperation with the switching device and connects the user interface to the active communication module.

Thereby, at least two communication modules are integrated in one communication device, thereby enabling the user of such communication device to connect to one or more communication networks with two or more telephone numbers and/or data connection lines.

In accordance with a preferred embodiment of the present invention, the switching device detects the orientation of the communication device with a gravity sensor, so that a first communication module is activated if the communication device

is held in one way and another communication module is activated if the communication device is tilted by e.g. 90°, 180° or 270°. Dependent upon the orientation of the communication device, the user interface of the present invention, comprising at least one touch screen and one display, switches between such touch screen and display, depending on which side of the communication device is held in an upwards and/or downwards position. Such switchable touch screen e.g. shows a display on the upper side of the communication device and a key pad on the lower side as it is known from a regular mobile phone, while such touch screen changes when the communication device is rotated about 180°. In such case, the upper part (formerly the lower part) is again showing a display, while the lower part is showing a key pad for inputting information.

The user interface of the present invention comprises at least a first orientation in which a display is oriented towards a first edge of the housing, while the key pad is oriented towards a second edge of said housing and second orientation in which said display is oriented towards said second edge of the housing, while the key pad is oriented towards said first edge of the housing. In that way it is possible to integrate two, three or four communication modules in one mobile phone, thereby enabling the user to use two, three or four telephone numbers, depending on which of the four sides of e.g. a rectangular mobile phone is held upwards. Alternatively, each of the communication modules of the communication device can be activated by the user and/or the network data input which is, for example, an incoming call activating one of the multiple communication modules.

Preferably, the first and second orientation or any additional orientation of the user interface corresponds to the orientation of the housing, as detected by the switching device. The switching device would also detect an incoming call or a certain switch button as activated by the user of such communication device, selecting one of said multiple communication modules.

The first and second orientation of the user interface can also correspond to an activation mode of the communication device, wherein said activation mode is dependent on said network access information. Depending on the network in which the user uses his mobile phone, the corresponding communication module is automatically activated by a data exchange between the communication device and the network, once it is switched on.

The communication device has preferably a first edge and a second edge which are angled by at least 90° , preferably by about 180° . Depending upon the number of communication modules and communication modi, the communication device can have two, three, four or more preferred sides with a corresponding opposite side, so that the shape is triangular, rectangular or multi-angular.

In accordance with a most preferred embodiment of the present invention, the user interface has two touch screens which are located towards said first edge and said second edge of said housing, respectively, wherein each touch screen is either a display or a key pad, depending on the active communication module to which said user interface is connected. Said housing comprises preferably an additional physical key pad which is

connectable to either of the communication modules, wherein the controller connects said physical key pad to the active communication module and/or vice versa. The user of such communication device can use such physical key pad in order to choose the desired communication module/communication modus/communication network.

Each communication module has the necessary devices for connecting the communication device to a certain network via a certain data interface. Therefore, each communication module comprises a CPU, an activation unit, a radio controller, a memory and all other necessary equipment as generally known from prior art communication devices such as mobile phones. However, the communication modules can also share certain equipment, such as the memory (with a common telephone book), a common bus-system, a central CPU or the radio controller for transmitting and/or receiving radio frequencies, together with a suitable antenna.

The communication device of the present invention has preferably a first side with said touch screen used for displaying and inputting information, depending on the activated communication module, as well as another opposite side which is the back side of the communication device, comprising a camera, an audio device, such as an MP3-player and/or any other suitable addition, such as a detachable ear-phone.

In accordance with the present invention, the method for switching between communication modules in a wireless communication device comprises a communication device with a housing, with at least two communication modules for

establishing a communication with at least one communication network, based on different network access information, wherein the orientation and/or activation mode of the communication device is detected by a switching device. An active communication module is determined by a controller in cooperation with the switching device, thereby connecting a user interface to the active communication module and wherein said user interface displays information of the active communication module and allows the input of information for said active communication module. Preferably, the display will be on the upper side of the communication device, while the key pad will be on the lower side, so that when the communication device is rotated, the key pad and the display exchange their position. The method of the present invention activates the communication module throughout the orientation of the communication device and/or throughout an incoming call and/or throughout inputted information, preferably via a physical key pad.

In accordance with another aspect of the present invention, the wireless communication device is used for choosing a communication module with its specific network access information by turning said communication device by 180° and/or by pushing an activation key on a physical key pad and/or by receiving data, such as an incoming call from the network related to such specific network access information.

A preferred embodiment of the present invention is a mobile telephone comprising two touch screens on either side of the front side of the mobile phone, wherein the first touch screen will be a display and the other touch screen will be a key pad when one of two communication modules is activated, while the

touch screens change their purpose when the mobile phone is rotated around its vertical axis, thereby activating the second communication module, wherein the key pad becomes the display and the display becomes the key pad. Such preferred embodiment is further described in accordance with the attached drawings, wherein

Fig. 1 shows schematically a three-dimensional representation of the wireless communication device, and

Fig. 2 shows a preferred connection diagram of the core functionality of the present invention.

Fig. 1 shows a communication device 1 in accordance with the present invention, having a user interface 5, comprising a display 2, a key pad 3 and physical key pad 4. Display 2 and key pad 3 are interchangeable, so that in a first communication modus the upper, in the drawing left touch screen is turned into a display, while the other, in Fig. 1 lower touch screen turns into a key pad, while the key pad 3 turns into a display 2 and the display 2 turns into a key pad 3, once the mobile phone is rotated around a vertical axis 18 in a rotation direction R.

The communication device 1 of the present invention has preferably a first side indicator 6a and second side indicator 6b, showing the user which communication module is activated and/or which communication modus can be used. Furthermore, each side of the mobile phone has a loudspeaker 8a, 8b as well as a microphone 7a, 7b. Depending on the orientation of the

communication device 1, a first loudspeaker 8a and a first microphone 7a are activated, while a second loudspeaker 8b and a second microphone 7b are activated in the other orientation, when another communication modus and another communication module are activated.

The housing 9 of the communication device 1 has a slot 10 for inserting activation cards, such as SIM-cards and a data port 11 for connecting the communication device to other devices, such as a personal computer.

Fig. 2 shows a diagram of the core functionality of the present invention, wherein a first communication module 12 and a second communication module 13 are connected to a switching device 16 and a controller 14. The switching device 16 detects the orientation and/or an activation mode of the communication device 1 and sends such information to the controller 14. The orientation of the communication device 1 can be detected by a gravity sensor 17 (schematically shown). The controller 14 then connects one of the two communication modules 12, 13 to the user interface 5 which turns respective touch screens into displays 2 or key pads 3, depending on the orientation information as derived from the controller 14.

In accordance with a preferred embodiment of the present invention, the communication device 1 is a mobile phone, such as a dual GSM/CDMA, GSM/GSM or CDMA/CDMA with two SIM-RUIM cards. Depending upon the kind of network (GSM or CDMA), the respective communication module running the GSM modus or the CDMA modus is activated. If e.g. a call is coming in from the GSM network, the first side indicator 6a (such as a LED) is indicating that such first side is activated, while the touch

screens turn into a display 2 and a key pad 3, respectively. Also the physical key pad 4 will be connected to the first communication module 12, being e.g. responsible for the GSM network.

If e.g. the user wants to make a call via the CDMA network, he either turns the mobile phone in the orientation so that the second side indicator 6b is up and the respective key pad 3 and display 2 are activated and connected to the second communication module 13, or the user touches a respective key on the physical key pad 4 in order to activate the second communication module 13.

In accordance with a preferred embodiment of the present invention, both communication modules share the same PBA or they have different PBAs. Preferably, both communication modules are connected with a network cable in order to share the same phone book and/or the same memory and radio controller.

In accordance with another preferred embodiment of the present invention, the communication device 1 has no physical key pad 4 but a large touch screen displaying the necessary functionalities for the user.

The communication device 1 of the present invention has preferably a USB-power connection which is also used for transferring and synchronizing data, e.g. with a PC. Data exchange is also possible via blue tooth or KPLS or UTMS.

The user of the communication device 1 of the present invention can use two different SIM-cards which are both

inserted into slot 10, so that the mobile phone can be used and activated in two different modi, depending on the activated communication module. The user can use the mobile phone with two different telephone numbers or two different networks or for two different telephone lines, depending on her or his preference. The user is no longer forced to carry around two different mobile phones, since the user can use one and the same mobile phone simultaneously for two different purposes in two different communication modi. It is also possible to use a RUIM or any other technology standard for programming/activating the respective communication modules.

Claims

1. A wireless communication device (1) comprising
a housing (9) with at least two communication modules
(12, 13) for establishing communication with at least
one communication network (15), based on different
network access information,
a switching device (16) for detecting an orientation
and/or an activation mode of the communication device
(1),
at least one user interface (5), having a display
functionality for displaying information and an input
functionality for inputting information, and
a controller (14) for determining an active
communication module (12, 13) in cooperation with the
switching device (16) and for connecting the user
interface (5) to the active communication module (12,
13).
2. The communication device of claim 1,
characterized in that,
said switching device (16) detects the orientation of
the communication device (1) with a gravity sensor (17).

3. The communication device of claims 1 or 2, characterized in that, said user interface (5) comprises at least one touch screen which is switchable between a display (2) and a key pad (3).
4. The communication device of one of the preceding claims, characterized in that, said user interface (5) comprises a first orientation in which a display (2) is oriented towards a first edge of said housing (9), while said key pad (3) is oriented towards a second edge of said housing (9) and a second orientation in which said display (2) is oriented towards said second edge of said housing (9), while said key pad (3) is oriented towards said first edge of said housing (9).
5. The communication device of one of the preceding claims, characterized in that, said first and second orientation of said user interface (5) corresponds to the orientation of said housing (9) as detected by the switching device (16).
6. The communication device of one of the preceding claims, characterized in that, said first and second orientation of said user interface (5) corresponds to an activation mode of said communication device (1), wherein said activation mode is dependent on said network access information.
7. The communication device of one of the preceding claims, characterized in that,

said first edge and said second edge of said housing (9) are angled by at least 90°, preferably by about 180°.

8. The communication device of one of the preceding claims, characterized in that, said user interface (5) has two touch screens which are located towards said first edge and said second edge of said housing (9), respectively, wherein each touch screen is either a display (2) or a key pad (3), depending on the active communication module (12, 13) to which said user interface (5) is connected.
9. The communication device of one of the preceding claims, characterized in that, said housing (9) comprises an additional physical key pad (4) which is connectable to either of the communication modules (12, 13), wherein the controller (14) connects said physical key pad (4) to the active communication module (12, 13).
10. The communication device of one of the preceding claims, characterized in that, a first side of said communication device (1) has one touch screen used for displaying and inputting information, depending on the activated communication module (12, 13), while the other opposite side of said communication device (1) comprises a camera, an audio device and/or any other suitable addition, such as a detachable ear-phone.

11. Method for switching between communication modules (12, 13) in a wireless communication device (1), comprising a housing (9) with at least two communication modules (12, 13) for establishing a communication with at least one communication network (15), based on different network access information, wherein

(i) the orientation and/or activation mode of the communication device (1) is detected by a switching device (16),

(ii) an active communication module is determined by a controller (14) in cooperation with the switching device (16), thereby connecting a user interface (5) to the active communication module (12, 13),

(iii) said user interface (5) is displaying information from the active communication module (12, 13) and allowing the input of information for said active communication module (12, 13).

12. Method of claim 11, wherein said communication modules (12, 13) are activated by the orientation of the communication device (1).

13. Method of claim 11, wherein said communication modules (12, 13) are activated by an in-coming call and/or by inputted information, preferably via a physical key pad (4).

14. Use of the wireless communication device (1) as claimed in claim 1 for choosing a communication module (12, 13)

with its specific network access information by turning said communication device (1) through 180° and/or pushing an activation key on a physical key pad (4) and/or by receiving an in-coming call being related to such specific network access information.

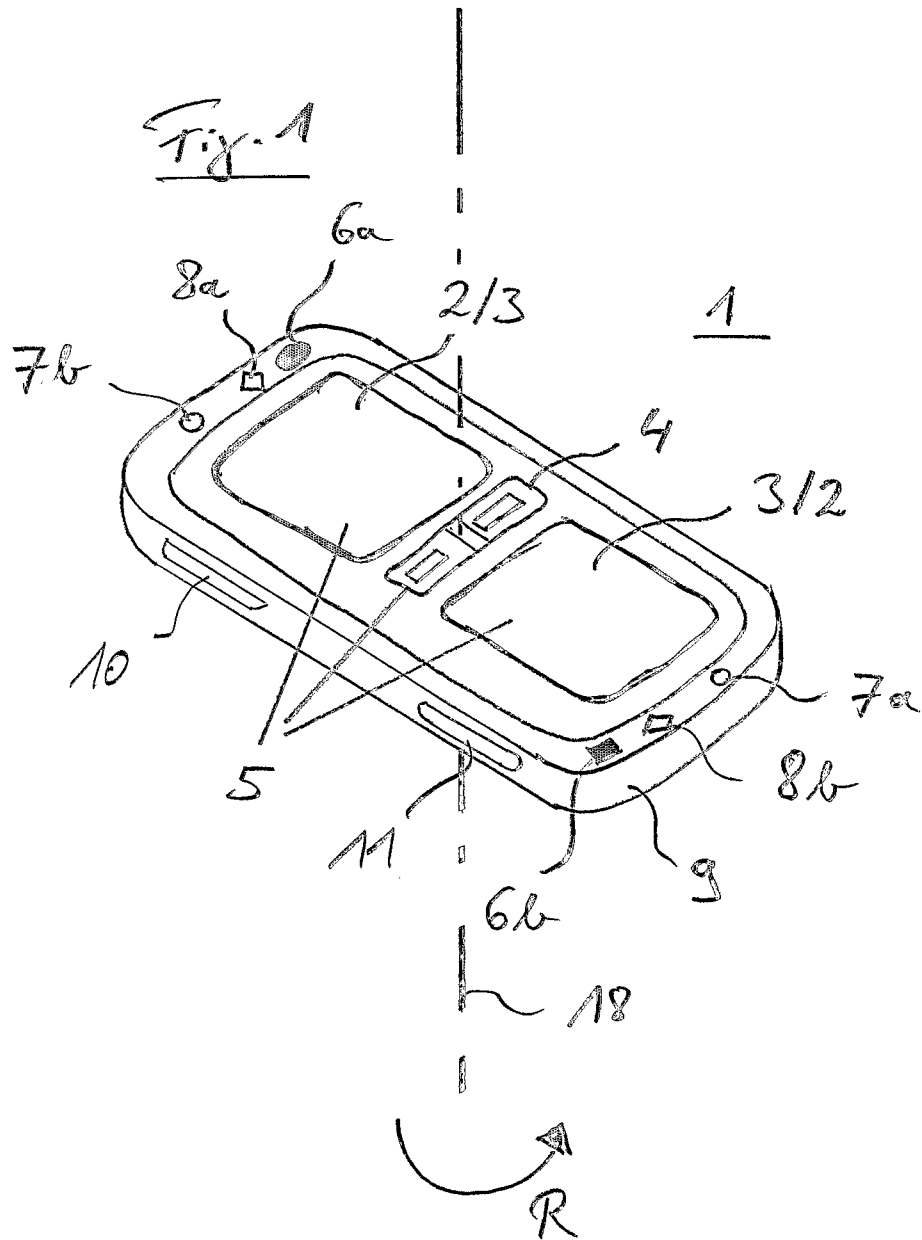
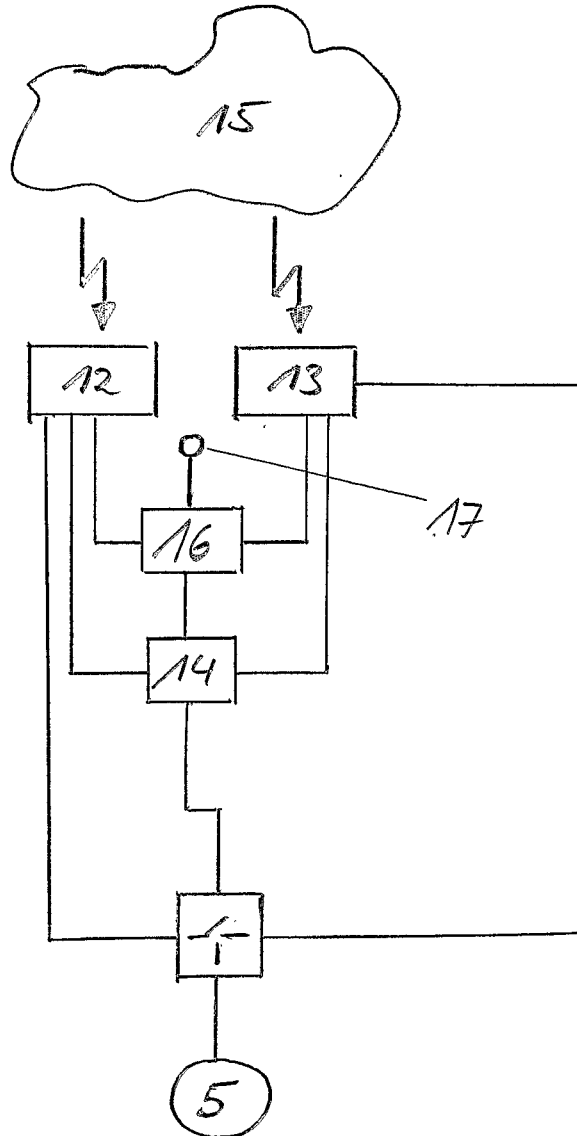


Fig. 2



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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
H04Q H04M

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

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

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 2 404 821 A (NEC TECHNOLOGIES [GB]) 9 February 2005 (2005-02-09)	1,9-11, 13,14
Y	page 1, paragraph 4 - page 2, paragraph 1 page 2, paragraphs 4,5 page 4, paragraph 4 page 5, paragraph 4	3-5,7
Y	US 2005/143124 A1 (KENNEDY PETER J [US] ET AL KENNEDY PETER J [US] ET AL) 30 June 2005 (2005-06-30) paragraphs [0004], [0005]; figure 1	3-5,7

Further documents are listed in the continuation of Box C.

See patent family annex.

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AMOROTTI, M

INTERNATIONAL SEARCH REPORT

Information on patent family members

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GB 2404821	A	09-02-2005	NONE
US 2005143124	A1	30-06-2005	EP 1716696 A1 02-11-2006 JP 2007517462 T 28-06-2007 WO 2005069593 A1 28-07-2005