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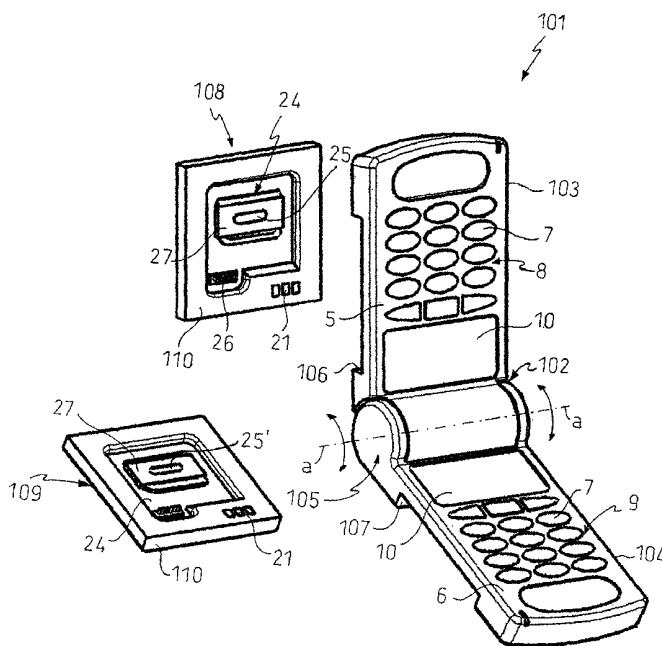
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(54) Title: DOUBLE-ACTING TELECOMMUNICATION APPARATUS FOR MOBILE TELEPHONY



(57) Abstract: A telecommunications apparatus for mobile telephony comprising a first mobile telephone device for the reception/transmission of first communications signals and which can be associated operatively with a first data card (25); a second mobile telephone device for the reception/transmission of second communications signals independently of the first device and which can be associated operatively with a second data card (25') distinct from the first data card, the first and the second device being accommodated in a single support structure (102).



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## DOUBLE-ACTING TELECOMMUNICATION APPARATUS FOR MOBILE TELEPHONY

## DESCRIPTION

The present invention relates to a telecommunications apparatus for mobile telephony.

5 In general, a mobile telephone, such as, for example, a cellular telephone, comprises a casing which is typically produced from plastics material and inside which is accommodated a telephone device, that is to say, the set of functional modules or units necessary for the  
10 functioning of the mobile telephone, such as, for example, an antenna, a signal modulation and demodulation circuit, a control microprocessor and transducer elements.

As is known, a mobile telephone, in particular in  
15 the field of cellular telephony, is associated with a memory card or data card, for example a SIM card (Subscriber Identity Module card), which typically stores items of information which relate to the identity of each user and which are used to identify the type of  
20 subscription which the user has to the telephone service. In general, the data stored on a data card used in the field of mobile telephony relate, apart from to the identity of the subscriber, his telephone number and his personal identification number (PIN), also to information  
25 relating to the charge for calls made and to the number

of failed attempts to key in the PIN.

A conventional mobile telephone is provided with a suitable seating for the data card and with a reading device which transfers the data stored on the card to the memories inside the mobile telephone. The mobile telephone makes this information available to the communications system.

The storage on removable data cards of data relating to the type of subscription which a user has enables the same mobile telephone to be used in cases where subscriptions are with different mobile telephone service providers or with the same provider but with different telephone numbers and subscription characteristics.

This possibility offered by data cards is being increasingly employed by users because the increase in the number of mobile telephone service providers brings about an increase in the types of subscription available to the user. The various types of subscription, whether offered by different providers or by a single provider, differ in respect of the tariffs and in respect of the time bands in which the tariffs are applied. Thus, it is becoming increasingly common for users to possess several data cards, each corresponding to a different subscription and to a different telephone line, in order to be able to choose, on the basis of the time band and

the tariff, which provider and which telephone line to use.

Furthermore, the user can associate telephone lines intended for communications of different types with each data card, a user often employing one telephone line for personal communications and another telephone line for work communications.

In the majority of mobile telephones commonly in use, the possibility of making use of more than one line is subject to the manual replacement of the data card inside the mobile telephone.

Mobile telephones are also known which remove the need to replace the data card manually but which comprise two seatings for accommodating two data cards and a switching device which selectively connects the reading device contained in the mobile telephone to the data card which it is desired to use.

In any case, for a conventional mobile telephone, only one data card associated with a single subscription is used during the operation of the mobile telephone and therefore only one telephone line is activated.

In other words, with conventional mobile telephones, the use of several data cards, in particular two data cards, is limited to an alternative use thereof. For example, the use for a given period of time of only one

of the two data cards possessed by the user enables only one telephone line to be activated, thus causing all the possible calls on the telephone line associated with the other card to be missed.

5           The object of the present invention is to provide an apparatus for mobile telephony which overcomes the limitations and disadvantages exhibited by known mobile telephones in respect of the use of several data cards.

          The object is achieved with a telecommunications  
10 apparatus for mobile telephony comprising:

- a first mobile telephone device for the reception/transmission of first communications signals and which can be associated operatively with a first data card;
- 15 - a second mobile telephone device for the reception/transmission of second communications signals independently of the first device and which can be associated operatively with a second data card distinct from the first data card, the first and the second device  
20 being accommodated in a single support structure.

          The invention will be better understood from the description of its non-limiting exemplary embodiments which is given with reference to the appended drawings in which:

25           Figure 1 is a side view of a first embodiment of a

telecommunications apparatus for mobile telephony according to the invention;

Figure 2 is a perspective view of the apparatus of Figure 1;

5 Figure 3 is a section through the apparatus of Figure 1 taken on the plane I-I;

Figure 4 shows by means of functional blocks an example of a telephone device which can be used in the apparatus of Figure 1;

10 Figure 5 shows an embodiment of the invention as a first alternative to the apparatus of Figure 1;

Figure 6 shows an embodiment of the invention as a second alternative to the apparatus of Figure 1.

15 Figures 1, 2, 3 and 4 show as a whole a first embodiment of an apparatus for mobile telephony 1 comprising a support structure 2 which accommodates a first and a second telephone device suitable for operating in a mobile telephony system.

20 The first and the second telephone device are analogous to one another and each of them may be of any type known in the mobile telephony sector and, in particular, in the field of cellular telephony.

It will be noted that the first telephone device and the second telephone device are suitable for functioning 25 independently, that is to say, each of them can receive

and transmit respective telecommunications signals in a manner which does not correlate with the state of operation of the other.

For completeness of description, Figure 4 shows 5 diagrammatically an exemplary structure of a mobile telephone device, for example, a telephone device for cellular telephony, which can be used in the apparatus 1 to form the first or the second telephone device. The telephone device of Figure 4 comprises a plurality of 10 functional units which in their turn include electrical and/or electronic components and/or circuits. In more detail, the device of Figure 4 comprises an antenna 41 for receiving the telecommunications signals transmitted from a base station (not shown). The antenna 41 is 15 connected to a receiving/transmitting circuit 42 for radio signals, the function of which is to convert the frequency of the signal received at the antenna 41 into an intermediate frequency. The receiving/transmitting circuit 42 is connected to a modulator/demodulator 20 circuit 43 capable of demodulating the intermediate frequency signal in order to output a digital signal to be coded in a coding/decoding circuit 44 for error correction. A digital conversation signal and a digital control signal are available at the output of the circuit 25 44. The digital control signal associated, for example,

with the protocol used by the system, is supplied to a suitable control circuit 48 which controls, for example, the allocation of a suitable transmission channel to a particular conversation. The digital conversation signal is supplied to an audio coding/decoding circuit 45 which outputs an analogue conversation signal. The analogue conversation signal is converted into a sound signal, or voice signal, by a suitable telephonic receiver 46. In the transmission stage, the voice signal associated with the conversation, after being converted into an electrical signal by a transducer, such as, for example, a microphone 47, is coded into a digital transmission signal by the audio coding/decoding circuit 45. The digital transmission signal, and the digital control signal, generated by the control circuit 48, after coding has taken place in the coding/decoding circuit 44 for error correction, is sent to the modulator/demodulator circuit 43 in order to be suitably modulated. The signal so modulated is converted into a high-frequency signal by the receiving/transmitting circuit 42 in order to be transmitted to the base station by the antenna 41.

Associated with the control circuit 48, typically comprising a microprocessor, is a device 49 for reading data cards which can be connected to a data card by suitable connecting means 50, for example, a digital data



transport bus comprising a plurality of lines. The device 49 for reading data cards enables the data stored on the data card to be transferred to a memory of the control circuit 48. The control circuit 48 makes those data 5 available to the communications system.

The telephone device of Figure 4 is advantageously provided with a switch 51 for interrupting or reactivating the electrical connection of the telephone device to an external source of electrical power, such 10 as, for example, a battery.

Preferably, the telephone device of Figure 4 is provided with interface means 52 which permit connection to a conventional headset. As is known, a headset comprises earphones, a microphone and appropriate 15 electrical connection terminals (for example, a plug) suitable for connecting the headset to the interface means 52 of the telephone device.

Referring now to Figures 1 to 3, it can be seen that the first and the second telephone device accommodated in 20 the support structure 2 may be distinct devices. In that case, the two telephone devices are separate and each of them includes all the components necessary for their respective functioning. Alternatively, some functional units of the two telephone devices, such as, for example, 25 the antenna, the modulation/demodulation circuit 43,

particular memories or integrated circuits contained in the control circuit 48 or the control circuit itself, may be provided only singly, in other words, not replicated for each telephone device. In that case, those functional  
5 units are shared by the two telephone devices in a manner compatible with the above-mentioned independence of operation of the two devices. Furthermore, suitable electrical connections, such as, for example, a data transfer bus, may be present between some functional  
10 units associated with the first and the second telephone device in order to permit the transfer from one telephone device to the other of data or information, such as, for example, stored telephone numbers.

It will be noted that the first and the second  
15 telephone device, analogously to conventional telephone devices, may be manufactured using integrated semiconductor circuits and printed circuit boards. Those known production techniques make it possible to obtain devices of limited dimensions, which enables the overall  
20 dimensions of the apparatus 1 to be selected in such a manner as to ensure easy handling and a reduced space requirement.

Referring to Figure 1, it will be noted that the support structure 2 has a substantially parallelepipedal  
25 shape and comprises a first casing 3, which is arranged

to the left of the line I-I and which is to contain the first telephone device, and a second casing 4, which is arranged to the right of the line I-I and which is to contain the second telephone device.

5       The first casing 3 and the second casing 4 are rigidly connected to one another at the location of an upper portion 2' of the support structure 2 in order to constitute a single body. The casings, which are produced, for example, from plastics material, may be  
10 constructed separately in order then to be suitably connected, for example, by interlocking or by fusion, or, preferably, they may be constructed in a single piece forming the support structure 2.

      The first casing 3 and the second casing 4 comprise,  
15 respectively, opposite external lateral walls or faces 5 and 6, at the location of which are respectively accessible a first keyboard 8, associated with the first telephone device, and a second keyboard 9, associated with the second telephone device. The keyboards are  
20 provided with keys 7 for keying-in, for example, telephone numbers.

      In addition, two displays 10 are present on the lateral walls 5 and 6 and are respectively associated with the first and the second mobile telephone device  
25 (only the display associated with the lateral wall 5

being shown in the drawings). The lateral walls 5 and 6 comprise respective openings 28 for connection to a telephonic receiver, such as the receiver 46, and respective openings 29 for connection to a microphone, such as the microphone 47.

Also accessible at the location of those lateral walls 5 and 6 are two cursors or buttons (not shown) for controlling two on/off switches, analogous to the switch 51, each separately connected to one of the two telephone devices accommodated by the support structure 2.

If the first and the second telephone device permit the use of a respective headset, the support structure 2 is advantageously provided with two seatings (not shown), each of which is provided with electrical terminals for connection to the interface device 52 of each telephone device. The two seatings are also suitable for accommodating, respectively, the electrical connection terminals with which each headset is provided.

Furthermore, the antenna 41, which may also be common to the first and the second mobile telephone device, is, for example, of a removable type or of a type secured to the inside of the support structure 2.

As shown in Figure 2, the support structure 2 comprises a seating 11 delimited laterally by an internal wall 12 of the first casing 3 and by an internal wall 13

of the second casing 4 and delimited at the top by a lower wall 14 of the portion 2' of the support structure 2. The seating 11 is to accommodate a body 17 which will be described hereinafter.

5           Figure 3 shows a longitudinal section through the apparatus 1 taken on the plane I-I. The internal wall 12 of the seating 11 is visible in this Figure.

          Electrical terminals 15, for example of the resiliently- yielding type, are associated with the  
10 internal wall 12 in order to provide the first telephone device contained in the first casing 3 with suitable electrical power. In particular, the electrical terminals 15 are connected to the switch 51 described with reference to Figure 4.

15           Moreover, electrical terminals 16 are also present at the location of the internal wall 12 in order to send the data stored on a data card to the reading device 49 of the first telephone device. The electrical terminals 16 are formed, for example, by resiliently-yielding  
20 terminals or by contact pads or in some other manner suitable for the purpose.

          The internal wall 13 of the second casing 4 will not be described because it is entirely analogous to the wall 12 described above with reference to Figure 3.

25           The body 17 comprises a container 19 which is

manufactured, for example, from plastics material and which is suitable for containing a battery (not shown in Figure 2) for providing electrical power for the first and the second telephone device. The battery accommodated  
5 in the container 19, compatibly with space requirements, may be of any type used in conventional mobile telephones.

The container 19 is provided with two external and opposite lateral faces 20 (only one of which is shown in  
10 Figure 2) for facing the internal walls 12 and 13, respectively, of the seating 11 when the body 17 is inserted in said seating.

Both of the faces 20 of the container 19 are provided with electrical terminals 21 which are connected  
15 to the battery and which are suitable for coming into contact, when the body 17 is inserted in the seating 11, with the terminals 15 present on the internal walls 12 and 13 of the seating.

In addition, the container 19 is provided with a  
20 first and a second opening 23 arranged, respectively, on the two external faces 20 of the container 19 (only one of the two openings 23 is shown in Figure 2). A first and a second seating 24, each of which is suitable for accommodating a data card 25, are respectively arranged  
25 in the first and the second opening 23.

Each seating 24 is provided with suitable electrical terminals (not shown), for example, of a resiliently-yielding type which are suitable for coming into contact with the data card 25 accommodated therein.

5       The electrical terminals arranged in each seating 24 are connected, for example, by means of tracks on a printed circuit (not shown), to respective electrical terminals 26. The electrical terminals 26 are arranged at the location of the first and the second opening 23 on  
10 each face 20 of the container 19. The terminals 26 of each face 20 are suitable for coming into contact, respectively, with the terminals 16 arranged on the first 12 and the second 13 internal wall of the seating 11.

Each seating 24 comprises means 27 for accommodating  
15 the respective data card 25. The accommodation means 27 are of the type normally used in conventional mobile telephones and have a substantially cage-shaped structure suitable for surrounding the data card at least partially. The accommodation means 27 may be of the fixed  
20 type (such as those shown in Figure 2) or of the type rotating about a suitable hinge in order to project out of the seating 24 to facilitate the insertion of the data card.

The body 17, which can be inserted in the seating  
25 11, is can be coupled mechanically to the support

structure 2 using conventional securing methods, for example, by interlocking or by interference between external edges of the body 17 and of the seating 11 or between elements suitably provided on the body 17 and in  
5 the seating 11.

As a result of the insertion of the body 17 in the seating 11, the first and the second telephone device, accommodated in the first casing 3 and in the second casing 4, respectively, are placed in contact with the  
10 battery and are each connected to a different data card 25 accommodated in the respective seating 24.

The data card 25 shown in Figure 2 and in the subsequent Figures is a data card of the micro-SIM type typically having dimensions of approximately 20 mm x 25  
15 mm, but data cards of any type can be used for the present invention. For example, it is also possible to use data cards having dimensions equal to those of conventional credit cards or any other element of different external form, including a memory device, which  
20 is capable of being inserted in a removable manner in a mobile telephone.

It will be appreciated that the telecommunications apparatus 1 according to the invention enables the two telephone devices contained therein to operate  
25 independently of one another. In particular, the first



and the second telephone device may be in operation simultaneously to receive and transmit telecommunications signals associated with two different conversations taking place on different telephone lines.

5       The apparatus 1 according to the invention permits the simultaneous use of two data cards associated with two different telephone lines belonging to the same provider or to different providers and, unlike conventional mobile telephones, enables the user to  
10 receive calls made on the telephone lines associated with both of the data cards without having to deactivate one of the two lines.

In addition, two separate headsets may be fitted to the apparatus 1 in order to enable two users to conduct  
15 two different telephone conversations simultaneously.

It will be appreciated that the apparatus 1 according to the invention can be used not only for the reception/transmission of telecommunications signals associated with conversations but also for  
20 telecommunications signals transporting information in digital form, for example, for communication with a telefax device or with an electronic computer, such as, for example, in the field of the INTERNET (INTERNational NETWORK).

25       Figure 5 shows a particular embodiment of the

invention which is an alternative to the telecommunications apparatus described in the previous Figures. In Figure 5 and in the following Figures, the same reference numerals used in the previous Figures will  
5 be used to indicate identical or similar elements.

Figure 5 illustrates a telecommunications apparatus 101 including a support structure 102 comprising a first casing 103 and a second casing 104, each of which is analogous to the casings 3 and 4 described above.

10 The first and the second casing 103 and 104, which are analogous to the first and the second casing 3 and 4, are suitable for accommodating the first and the second telephone device described above.

The first and the second casing 103 and 104 are  
15 coupled mechanically at two shorter sides.

Advantageously, the first and the second casing 103 and 104 are coupled mechanically by hinge means 105 which permit the rotation of at least one of the casings relative to the other. In particular, the first casing  
20 103 can rotate about an axis a-a between at least two operating positions.

Preferably, the hinge means 105 enable the first and the second casing 103 and 104 to assume a closed position in which the two lateral walls 5 and 6, comprising the  
25 two keyboards 8 and 9, respectively, are facing one

another, and an open position in which the two lateral walls 5 and 6 are arranged in a position in which they face away from one another as in the apparatus 1 described above.

5 In the closed position, the two keyboards 8 and 9 are advantageously protected from any external stresses.

The first and the second casing 103 and 104 comprise seatings 106 and 107, respectively, which are suitable for accommodating a body 108 and a body 109,  
10 respectively.

Each seating 106 and 107 comprises an internal wall which is analogous to the internal wall 12 described above with reference to Figure 3 and which is provided with electrical terminals for the battery and for the  
15 data card.

Each of the bodies 108 and 109, which are substantially identical to one another, comprises a container 110 for the battery, and electrical terminals 21 and 26. In addition, the body 108 is provided with the  
20 seating 24 for the data card 25 and the body 109 is provided with the seating 24 for the card 25'.

The functioning of the telephone apparatus 101 is analogous to that of the apparatus 1 described above.

Figure 6 illustrates a telecommunications apparatus  
25 201 which is an alternative to the apparatus 101 and

comprises a support structure 102 analogous to that described with reference to Figure 5.

The first and the second casing 103 and 104 comprise seatings 206 and 207 which are to accommodate, 5 respectively, a support element 208 for two data cards 25 and 25', and the battery 22. The seating 206 is provided with first electrical terminals and with second electrical terminals, which are both analogous to the terminals 16 and which are connected to the reading 10 devices of the first and the second telephone device. The seating 207 is provided with electrical terminals which are to supply power to the first and the second telephone device and which can be connected to the battery 22.

Furthermore, the device for reading data cards, 15 which is included in the second telephone device accommodated in the casing 104, is connected to the corresponding electrical terminals arranged in the seating 206 by suitable electrical connection means, such as tracks formed on a printed circuit, or flexible cables 20 of the ribbon type or other means known to the person skilled in the art. Analogously, the supply terminals present in the seating 207 are advantageously connected to the first telephone device accommodated in the casing 103 to provide the necessary electrical power.

25 The support element 208 is provided, on the same

wall, with two seatings 24, 24' for the two data cards 25 and 25' and with two separate pairs of electrical terminals 26 which can be connected to the data cards. In Figure 6, the means 27 for accommodating the data cards 5 25 and 25' are of the rotating type.

The support element 208 can be connected to the support structure 102 by conventional securing methods, such as, for example, by interlocking or by interference between the external edges of the support element 208 and 10 of the seating 206.

It will be appreciated that the support structure for accommodating the first and the second telephone device may also be in a form different from the particular forms described hitherto. For example, the 15 support structure may also comprise interconnection means of the releasable type, such as, typically, screws, between the first and the second casing.

Other forms of the support structure in accordance with the invention may be readily devised by the person 20 skilled in the art on the basis of the drawings and the above description.

**CLAIMS**

1. A telecommunications apparatus for mobile telephony comprising:

- a first mobile telephone device for the  
5 reception/transmission of first communications signals  
and which can be associated operatively with a first data  
card (25);

- a second mobile telephone device for the  
reception/transmission of second communications signals  
10 independently of the first device and which can be  
associated operatively with a second data card (25')  
distinct from the first data card, the first and the  
second device being accommodated in a single support  
structure (2).

15 2. A telecommunications apparatus (1, 101, 201)  
according to claim 1, wherein the first and the second  
device each comprise a respective switch (51) for  
interrupting/reactivating the supply of electrical power  
to the first and the second device, respectively.

20 3. A telecommunications apparatus (1, 101, 201)  
according to claim 1, wherein the first and the second  
telephone device each comprise a respective microphone  
(47) and a respective telephonic receiver (46) for  
permitting independent conversations.

25 4. A telecommunications apparatus (1, 101, 201)

according to claim 1, wherein the first and the second telephone device can be connected separately to different headsets.

5           5. A telecommunications apparatus (1, 101, 201) according to claim 1, wherein the first and the second telephone device each comprise at least one respective supply terminal (15) for receiving electrical power and at least one respective data-input terminal (16) for receiving data output by a data card.

10           6. A telecommunications apparatus (1, 101) according to claim 1, also comprising a carrying body (17; 108) which can be coupled mechanically to the support structure (2) and which includes a battery (22) for supplying power to at least the first device and a  
15 first seating (24) for accommodating the first data card (25).

          7. A telecommunications apparatus (1) according to claim 6, wherein the carrying body (17) also comprises a second seating (24) for accommodating the second data  
20 card.

          8. A telecommunications apparatus (1) according to claim 7, wherein the carrying body comprises first electrical terminals (26) for connection between the first data card and the first device and second  
25 electrical connection terminals, distinct from the first

means, for connecting the second data card to the second device.

9. A telecommunications apparatus (201) according to claim 1, also comprising a support element (208) which  
5 can be coupled mechanically to the support structure (2) and which is provided with a first and a second seating (24, 24') for accommodating the first (25) and the second (25') data card, respectively.

10. A telecommunications apparatus (201) according to claim 9, wherein the support structure (2) is provided  
10 with a seating (207) for accommodating a battery (22) for supplying power to the first and second device.

11. A telecommunications apparatus (1, 101) according to claim 1, wherein the support structure (2)  
15 comprises a first (3) and a second (4) casing for accommodating the first and the second device, respectively, the first and second casing comprising, respectively, a first wall (5) having an associated first keying-in keyboard (8) for the first device and a second  
20 wall (6) having an associated second keying-in keyboard (9) for the second device.

12. A telecommunications apparatus (1) according to claim 11, wherein the support structure (2) has a substantially box-shaped form and the first casing (3) is  
25 rigidly connected to the second casing (4) in such a



manner that the first wall (5) and the second wall (6) are arranged on opposite sides of the support structure (2).

13. A telecommunications apparatus (101) according to claim 11, wherein the first casing (103) and the second casing (104) are connected by hinge means (105) permitting rotation of the first casing relative to the second casing.

14. A telecommunications apparatus (101) according to claim 13, wherein the hinge means (105) enable the first casing (103) to rotate relative to the second casing (104) between a closed position in which the first (5) and the second (6) wall are facing one another, and an open position in which the first (5) and the second (6) wall face away from one another.

15. A telecommunications apparatus (1, 101, 201) according to claim 1, wherein the first device is distinct from the second device.

16. A telecommunications apparatus (1, 101, 201) according to claim 1, wherein the first and the second device comprise at least one common functional unit (41; 48).

17. A telecommunications apparatus (1, 101, 201), also comprising an electrical connection between at least a first functional unit (48) of the first device and at

least a second functional unit of the second device for transferring data between the first and the second device.

INTERNATIONAL SEARCH REPORT

International Application No  
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<b>A. CLASSIFICATION OF SUBJECT MATTER</b> IPC 7 H04M1/02 H04M1/725		
According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b> Minimum documentation searched (classification system followed by classification symbols) IPC 7 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) PAJ, WPI Data, EPO-Internal		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 335 276 A (BIRDWELL GERALD G ET AL) 2 August 1994 (1994-08-02) abstract column 15, line 29 -column 17, line 24 figures 2,5,10	1,2, 5-10,15
A	---	3,4, 11-14
X	PATENT ABSTRACTS OF JAPAN vol. 1995, no. 09, 31 October 1995 (1995-10-31) & JP 07 143051 A (NEC CORP), 2 June 1995 (1995-06-02) abstract ---	1
	-/--	
<input checked="" type="checkbox"/> Further documents are listed in the continuation of box C. <input checked="" type="checkbox"/> Patent family members are listed in annex.		
* Special categories of cited documents : *A* document defining the general state of the art which is not considered to be of particular relevance *E* earlier document but published on or after the international filing date *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) *O* document referring to an oral disclosure, use, exhibition or other means *P* document published prior to the international filing date but later than the priority date claimed *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. *&* document member of the same patent family		
Date of the actual completion of the international search  18 December 2001		Date of mailing of the international search report  28/12/2001
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016		Authorized officer  Golzio, D

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
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A	<p>US 5 924 044 A (ALBERTH JR WILLIAM P ET AL) 13 July 1999 (1999-07-13)                      abstract                      column 2, line 40 -column 6, line 26                      column 9, line 6 -column 10, line 49                      figures 1-7,15-17                      ---</p>	1-17
A	<p>DE 199 34 926 A (TREY HERMANN)                      3 February 2000 (2000-02-03)                      the whole document                      -----</p>	1-17

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