Title: AUTOMATIC TRANSMISSION OF A MOBILE PHONE'S OWN IDENTIFICATION NUMBER

Abstract: A wireless telephone (including any wireless telephone device, such as a wireless telephone) includes software or hardware or a combination of the two to provide an automatic dialing feature. The information automatically transmitted when a user presses a single key or a combination of keys is the mobile identification number (MIN) of the wireless telephone, although any other information stored by a wireless telephone may be provided automatically as well. The invention is particularly useful when a user is attempting to enter the MIN when communicating over a wireless connection with a paging system. The software or hardware (or combination of the two) permits accessing a paging system for a called party, and upon receipt of a request from the paging system for the MIN and an action initiated by a user, initiating the automatic sequence to transmit the MIN to the paging system. The MIN is then transmitted to the paging system. In addition, a termination sequence can be added to the step of initiating the automatic sequence, with the termination sequence being transmitted following the transmission of the MIN. Also included is the step of automatically terminating the connection after a predetermined timeout period following the transmission of the MIN, or of the MIN and the termination sequence.
Before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments.

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.
AUTOMATIC TRANSMISSION OF A MOBILE PHONE'S OWN IDENTIFICATION NUMBER

BACKGROUND OF THE INVENTION

I. Field of the Invention

The present invention generally relates to wireless telephones, and more specifically to software residing on wireless telephones. Still more specifically, the invention relates to automatically transmitting a wireless phone's identification number upon request.

II. Description of the Related Art

Wireless telephones are communications devices that function in a wireless environment. There are three basic types of wireless telephones. Portable phones are typically small, handheld devices and can be carried on the person. Mobile phones are typically mounted in a vehicle; they have a base unit or cradle that is fixedly mounted to the vehicle, usually inside the passenger compartment, and a handset that is connected to the base unit or cradle by a wire. A fixed wireless phone is usually mounted in a single location. Any of these types of phones can be operated over a terrestrial cellular network or over a satellite communications network. Some wireless phones are capable of operating over both cellular and satellite systems. Telephones that operate over short range wireless links, such as portable phones that are used in the home or small business environment, and which transmit to and receive signals from a single fixed base station over a short range (for example, several hundred to a thousand meters) are not considered wireless phones for purposes of this disclosure. Such single station, short range wireless phones are typically called "cordless phones" and are considered to fall into the category of standard wireline phones (that is, phones connected to the communications network by wires).

Wireless telephones generally have enhanced functionality compared to standard wireline telephones. Wireless telephones are said to have greater "intelligence." When a wireless telephone is powered up, it must identify itself to the base station in whose cellular area the wireless telephone is located, in
order to initiate communications. This identification is performed when the wireless telephone transmits its mobile identification number (MIN) to the local base station or stations. The MIN includes a MIN2, which is the area code of the wireless telephone, and a MIN1, which is the central office number followed by the station identification number of the wireless telephone. Typically, the MIN is the same as the telephone number of the wireless telephone. For example, for the MIN (555) 213-5597, 555 is the MIN2, and 213-5597 is the MIN1.

Usually, two hands are required to use the wireless phone. The user holds the phone or handset in one hand, and uses the fingers of the other hand to enter digits on the keypad. In some cases a user is able to operate the phone using one hand. The phone is cradled in the palm of the hand and data is "keyed in" using the thumb to press the keys. This operation can be inconvenient or even dangerous, as when the user attempts to place a call while driving a vehicle. One example of a difficult dialing situation is when a user wants to access a paging system. For example, suppose a user wishes to dial another user's paging service. The caller will dial the second user's paging service number. The called party's paging service will typically respond with a prerecorded message, requesting the caller to key in his own telephone number followed by a final key, such as a pound sign. If the caller uses a wireless telephone to make the call, then the telephone number the user must key in is the same as the user's MIN. Sometimes, the caller does not remember his wireless phone number. Even if the caller knows his wireless number, he must then key in all ten digits plus the pound or star key. This can be distracting if the caller is driving, or can be difficult if the caller does not have two hands free at that moment. What is needed is a more convenient way for the user to key in his MIN, by dialing fewer digits than the entire MIN.

**SUMMARY OF THE INVENTION**

The present invention is directed to an automatic dialing feature found in a wireless telephone. In one embodiment, the information automatically transmitted is the mobile identification number (MIN) of the wireless telephone, although any other information stored by a wireless telephone may be provided automatically as well. The invention is particularly useful when a user is
attempting to enter the MIN when communicating over a wireless connection with a paging system.

The present invention provides a method for transmitting the MIN of a wireless telephone to a called party’s paging system. Initially, the method comprises accessing a paging system for a called party. Upon receipt of a request from the paging system for the MIN, an automatic sequence is initiated to transmit the MIN to the paging system. The MIN is then transmitted to the paging system.

In one embodiment, the MIN is transmitted as one or more dual tone multi-frequency (DTMF) signals representing keys on the wireless telephone. The MIN comprises a MIN2 corresponding to an area code of the wireless telephone and a MIN1 corresponding to a central office number of the wireless telephone and a station identification number of the wireless telephone.

In one embodiment, a termination sequence is added to the step of initiating the automatic sequence. The termination sequence is transmitted following the transmission of the MIN. The termination sequence can be a DTMF signal corresponding to a single key of the wireless telephone. For example, the single DTMF signal can correspond to a pound key of the wireless telephone.

The step of accessing a paging system can comprise actuating the wireless telephone to receive a signal from the paging system and then permitting a user to depress a predefined key sequence to establish a connection with the paging system.

The transmission of the MIN can occur over a traffic channel. Also, the transmission of the MIN and the termination sequence can occur over a traffic channel.

Furthermore, in one embodiment, the connection can be automatically terminated after a predetermined timeout period following the transmission of the MIN, or following the transmission of the MIN and the termination sequence.

The above-noted steps can be performed by hardware means or software means or a combination of the two, residing in the wireless telephone.
BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be described with reference to the accompanying drawings. In the drawings, like reference numbers generally indicate identical, functionally similar, and/or structurally similar elements. The drawing in which an element first appears is indicated by the leftmost digit(s) in the reference number.

FIG. 1 illustrates an exemplary wireless telephone in block diagram form; FIG. 2 illustrates a flow chart of the steps of the method of the present invention; and

FIG. 3 illustrates a generic computer system which may be used to perform the operations of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention is described in terms of an example environment. In this example environment, a user automatically dials the mobile identification number (MIN) of the wireless telephone by depressing one or more keys, after a connection is established over a traffic channel with a paging system. The MIN is automatically retrieved from memory and transmitted to a base station. Description in these terms is provided for convenience only. It is not intended that the invention be limited to application in this example environment. For example, the user can use the wireless phone keypad to dial other information stored in the wireless phone memory as well. After reading the following description, it will become apparent to one skilled in the relevant art how to implement the invention in alternative environments.

FIG. 1 illustrates an exemplary wireless telephone 100 in block diagram form. Wireless phone 100 can comprise an analog device using analog (for example AMPS) signals, or alternatively as a digital device using digital (for example, CDMA) signals. For exemplary purposes, however, wireless phone 100 is described as a digital device.

Wireless phone 100 illustrated in FIG. 1 comprises a data entry device (such as a keypad) 102, a display 104, a digital processor 106, a receiver 108, a memory 109, a synthesizer 110, a transmitter 112, a power device 114, a crystal
oscillator 116, a duplexer 118 and an antenna 120. Power device 114 includes a power control 122 and a real time clock (RTC) 124.

As those skilled in the art will recognize, a variety of different types of wireless telephones can be modified in accordance with the functions of the present invention. This includes wireless telephones used for cellular, personal communications service (PCS) and satellite communications.

Data entry device 102 can include a keypad with keys labeled numerically and alphabetically. For normal functions, the user presses the keys to make an outbound telephone call. Data entry device 102 can include other input devices as well, such as a data keyboard having menu-driven buttons or arrow keys.

Display device 104 is a device that displays the telephone number of a called party, or other telephone numbers stored by wireless telephone 100. Display 104 may also display status information in a manner well known to skilled persons in the art.

Digital processor 106 incorporates a microprocessor and all of the digital circuitry required to operate the wireless telephone. For a digital wireless telephone functioning with CDMA communications, processor 106 includes decoders (for decoding received messages), encoders (for encoding transmitted messages), vocoders, interleavers, etc., which are items required for wireless telephone functionality. Processor 106 also includes one or more software tasks communicating with a microprocessor, as described further below.

Power device 114 is the device used to power the wireless telephone. Power device 114 comprises power control device 122 and RTC circuit 124. As those skilled in the art will recognize, a variety of different power control devices, such as standard wireless telephone batteries, can be used. RTC circuit 124 interacts with a crystal oscillator 116. RTC 124 performs the functions of a low power time keeper, that is, by keeping track of time in seconds, minutes, hours, days, weeks, months and years.

Transmitter 112 receives baseband signals from processor 106 and transmits these signals to antenna 120. Specifically, signals must be up-converted from the baseband frequencies to the intermediate frequencies (IFs) and from intermediate frequencies to the radio frequencies (RFs). In one embodiment, transmitter 112 requires up-converting modulators to convert the
signal from baseband frequencies to IFs, variable gain amplifiers to amplify the signal, up-converters to convert the signal from IF frequencies to the RFs, RF bandpass filters to filter the RF frequencies, and power amplifiers to amplify the resulting RF signal. However, those skilled in the art will recognize that any comparable transmitter can be used instead.

Receiver 108 receives RF signals from antenna 120 and transmits the signals to processor 106. The signals must be down-converted from the RF frequencies to the IF frequencies, and then further down-converted from the IF frequencies to the baseband frequencies. In one embodiment, receiver 108 includes a low noise amplifier (LNA) to amplify the received RF signal, bandpass filters to filter the entire radio receive band, down-converters to down convert the RF signal to an IF signal, bandpass filters to filter the IF band, variable gain amplifiers to amplify the signal, IF bandpass filters to filter the IF signal, other variable gain amplifiers to amplify the signal, and down-converting demodulators to demodulate the signal down to a baseband signal. However, those skilled in the art will recognize that any comparable receiver can be used instead.

Synthesizer 110 is a device that provides reference signals required by transmitter 112 and receiver 108. These reference signals are generated by a local oscillator (that is, a voltage controlled oscillator) and controlled by a phase locked loop (PLL) device. The PLL includes programmable dividers, a phase detector and a charge pump. The signals produced by synthesizer 110 are mixed with signals in receiver 108 and transmitter 110 to implement the noted down- and up-conversions (that is, between the RF, IF and baseband frequencies). The synthesizer can also include a time reference device, such as a temperature compensated crystal oscillator (TCXO). Those skilled in the art will recognize that any comparable synthesizer can be used instead.

Duplexer 118, which can comprise a plurality of bandpass RF filters, separates the RF signals transmitted from transmitter 112 and the RF signals received by receiver 108. For North American cellular telephones, 869 MHZ to 894 MHZ are used for received RFs, whereas 824 MHZ to 849 MHZ are used for transmitted RFs. In one embodiment, duplexer 118 uses one receive-side bandpass filter and one transmit-side bandpass filter to effect this separation. Duplexer 118 permits the wireless telephone to have full duplex
communications, so that both received and transmitted communications can be implemented simultaneously. Those skilled in the art will recognize that any comparable duplexer can be used instead, and in fact, that a duplexer need not be used to implement the present invention.

Antenna 120 transmits and receives RF signals. In one embodiment, antenna 120 is a dipole antenna. However, those skilled in the art will recognize that any comparable antenna can be used instead.

FIG. 2 is a flow chart illustrating the method of the present invention. In step 200, a user makes a telephone call to access a remote paging system. Prior to making this call, the wireless telephone 100 has already been powered up and is ready to establish communications in the traffic channel with a base station. Those skilled in the art will realize that the present invention can function in other channels being used in a digital (for example, CDMA) communications connection, or alternatively in an analog (for example, AMPS) communications connection as well.

Once the call has been connected, the paging system prompts the user to enter the telephone number of the calling party. For wireless devices, such as wireless telephone 100, the telephone number is the mobile identification number (MIN). As noted above, the MIN includes a MIN2, which is the area code of the wireless telephone, and a MIN1, which is the central office number followed by the station identification number of the wireless telephone.

In step 202, the caller takes a predetermined action that initiates an automatic sequence for transmission of the MIN2 and MIN1 of the wireless telephone 100 to the base station. In one embodiment, the user presses a key (for example, the message key or the information key) for a predetermined time period, such as 2 seconds, to initiate the automatic sequence. In this embodiment, a user interface task running in processor 106 compels RTC 124 to count down the period of 2 seconds. In another embodiment, the user presses a predefined key, followed by the "send" key to initiate the automatic sequence.

In yet another embodiment, the user presses a combination of two or more keys to initiate the automatic sequence.

For the present invention, there are three relevant software tasks running in processor 106, namely, a user interface task, a call processing task, and a nonvolatile memory task. In one embodiment, these software tasks are written
in the "C" language, including inline Assembly code. Those skilled in the relevant art will recognize that the names assigned to these tasks are provided for convenience, and are not limiting to the invention. The tasks are primarily defined by their respective functions. In addition, those skilled in the relevant art will recognize that the programming language, and other features of the software running in processor 106 are provided by way of explanation, and are not limiting.

In step 204, MIN1 and MIN2 are retrieved from memory 109. In one example, the user is required to hold down a key for a predetermined period of time, for example, 2 seconds. This time period is counted down by RTC 124. When this time period is up, RTC 124 so informs the user interface task running in processor 106. In response, the user interface task sends a message to the nonvolatile memory task. The nonvolatile memory task accesses nonvolatile memory 109, where MIN1 and MIN2 are stored. Using the nonvolatile memory task, the user interface task retrieves MIN1 and MIN2. In one embodiment, this retrieval is performed for MIN2 first, followed by MIN1. In another embodiment, this retrieval is performed for MIN1 first, followed by MIN2. In yet another embodiment, this retrieval is performed for the entire MIN at the same time. It is also important to note that the retrieval of the MIN can be performed at an earlier time period as well, such as when wireless telephone 100 is initially powered up. In that case, the MIN would be stored in the random access memory (RAM) portion of memory.

In step 206, the user interface task stores the MIN in a buffer and transmits the MIN to the call processing task. In one embodiment, the MIN is followed by a pound ("#") sign or key. The pound ("#") key (or any other suitable key) acts as an end of message signal. If MIN1 and MIN2 were retrieved separately, MIN2 is stored first, then MIN1 is stored, and a pound ("#") sign is added at the end.

In step 208, the call processing task utilizes the available communications channel to send the MIN (and preferably the # sign) to the base station. For a digital CDMA communications connection, a traffic channel is used. For this type of connection, the message is a spread spectrum CDMA message, which informs the base station to play the DTMF tones specified in the message to another party (for example, the party being paged). On the other hand, for an
analog connection (for example, an AMPS connection) the actual DTMF tones are sent as signals to the base station.

Additionally, in step 208 the call processing task sends the above-described message to the base station. For a CDMA connection over a traffic channel, the same message, or an additional message, requests that the base station terminate the traffic channel connection. In response, the base station terminates the traffic channel, and transmits an appropriate reply to wireless telephone 100.

Step 210 is an optional timer disconnection step permitting an automatic disconnection of wireless telephone 100 from the connection after a predetermined time period. In step 210, after step 208 is initiated, the user interface task compels RTC 124 to count down a time period (for example, 5 seconds). When the time period is up, RTC 124 so informs the user interface task. In response, the user interface task sends a message to the call processing task to release the call. In one embodiment, the call processing task ensures that the MIN has already been transmitted to the base station, and performs the additional processing of step 208 to terminate the connection.

The present invention is preferably implemented in software. Alternatively, the invention may be implemented using hardware or a combination of hardware and software. Consequently, the invention may be implemented in a computer system or other processing system. An example of such a computer system built into a wireless phone is shown generally in FIG. 3. A computer system 300 includes one or more processors, such as processor 304. The processor 304 is connected to a communication infrastructure 306 (for example, a bus or network). Various software implementations are described in terms of this exemplary computer system. After reading this description, it will become apparent to a person skilled in the relevant art how to implement the invention using other computer systems and/or computer architectures.

Computer system 300 also includes a first memory 308, preferably random access memory (RAM), and may also include a second memory 310, preferably a read only memory (ROM). Memory 310 allows computer programs or other instructions to be loaded into computer system 300.

Computer system 300 may also include a communications interface 324. Communications interface 324 allows software and data to be transferred
between computer system 300 and external devices. Examples of communications interface 324 may include a modem, a communications port, a PCMCIA slot and card, etc. Software and data transferred via communications interface 324 are in the form of signals which are capable of being received by communications interface 324. These signals 328 are provided to communications interface 324 via a communications path 326. Communications path 326 carries signals 328 and may be implemented using wire or cable, fiber optics, a phone line, a cellular phone link, an RF link and other communications channels.

In this document, the terms "computer program medium" and "computer usable medium" are used to generally refer to media such as ROM 310 or a removable storage device 314, such as a PCMCIA card. These computer program products are means for providing software to computer system 300.

Computer programs (also called computer control logic) are stored in RAM memory 308 and/or ROM memory 310. Computer programs may also be received via communications interface 324. Such computer programs, when executed, enable the computer system 300 to implement the present invention as discussed herein. In particular, the computer programs, when executed, enable the processor 304 to implement the process of the present invention.

Accordingly, such computer programs represent controllers of the computer system 300. In a preferred embodiment of the invention, the processes in which a cellular telephone is permitted (or denied) the placement or receipt of a call, learns and records the identities of the accessible cells, and performs cell handoffs, are all performed by computer control logic. Where the invention is implemented using software, the software may be stored in a computer program product and loaded into computer system 300 using ROM 310, removable storage device 314 or communications interface 324.

While various embodiments of the present invention have been described above, it should be understood that they have been presented by way of example only, and not limitation. Thus, the breadth and scope of the present invention should not be limited by any of the above-described exemplary embodiments, but should be defined only in accordance with the following claims and their equivalents.

We claim:
CLAIMS

1. A method for automatically transmitting the mobile identification number (MIN) of a wireless telephone stored in a memory location of the wireless telephone to a called party, comprising the steps of:
   accessing a paging system for the called party;
   upon receipt of a request from said paging system for the MIN and a predetermined action initiated by a user, automatically accessing the memory location in which the MIN is stored;
   recalling the MIN from the accessed memory location;
   automatically transmitting the recalled MIN to the paging system; and
   automatically transmitting an end of message signal following transmission of the recalled MIN.

2. The method according to claim 1, wherein the MIN is transmitted as one or more dual tone multi-frequency (DTMF) signals representing keys on the wireless telephone.

3. The method according to claim 1, wherein the MIN comprises:
   a MIN1 corresponding to a central office number of the wireless telephone and a station identification number of the wireless telephone; and
   a MIN2 corresponding to an area code of the wireless telephone.

4. The method according to claim 1, further comprising:
   adding a call termination signal to the transmitted MIN; and
   automatically terminating the call following the transmission of the MIN, the end of message signal and the call termination signal.

5. The method according to claim 4, wherein the termination signal is a single dual tone multi-frequency (DTMF) signal corresponding to a single key of said wireless telephone.
6. The method according to claim 5, wherein said single dual tone multi-frequency (DTMF) signal corresponds to a pound key of said wireless telephone.

7. The method according to claim 1, wherein said transmission of said MIN occurs over a traffic channel.

8. The method according to claim 4, further comprising transmitting the MIN and the termination signal over a traffic channel.

9. The method according to claim 1, further comprising:
   automatically terminating the connection following a predetermined timeout period following transmission of the MIN.

10. The method according to claim 1, further comprising:
    automatically terminating the connection following a predetermined timeout period following the transmission of the MIN and the termination signal.

11. A computer program product comprising a computer useable medium having computer program logic recorded thereon for enabling a processor contained in a wireless telephone to provide the mobile identification number (MIN) of the wireless telephone stored in a memory location of the wireless telephone over a connection, said computer program logic comprising:
    accessing means for enabling the processor to access a paging system for a called party;
    memory access means for enabling the processor to automatically access the memory location in which the MIN is stored upon receipt of a request from said paging system for the MIN and upon receipt of a predetermined action initiated by a user;
    recall means for enabling the processor to recall the MIN from the accessed memory location;
    transmit means for enabling the processor to automatically transmit the recalled MIN to the paging system; and
16. further transmit means for enabling the processor to automatically transmit an end of message signal following transmission of the recalled MIN.

12. A wireless telephone comprising a system for providing the mobile identification number (MIN) of a wireless telephone over a connection, the system comprising:
   access means for accessing a paging system for a called party;
   memory access means for automatically accessing the memory location in which the MIN is stored upon detection of a request from said paging system for the MIN and upon receipt of a predetermined action initiated by a user;
   recall means for recalling the MIN from the accessed memory location;
   transmit means for automatically transmitting the recalled MIN to the paging system; and
   further transmit means for automatically transmitting an end of message signal following transmission of the recalled MIN.

13. A method for automatically transmitting data stored in a memory location of a wireless telephone to a called party, comprising the steps of:
   accessing a destination location for the called party;
   upon receipt of a request from said destination for the stored data and a predetermined action initiated by a user, automatically accessing the memory location in which the data is stored;
   recalling the stored data from the accessed memory location;
   automatically transmitting the recalled stored data to the destination location; and
   automatically transmitting an end of message signal following transmission of the recalled stored data.

14. The method according to claim 13, further comprising:
   adding a call termination signal to the transmitted data; and
   automatically terminating the call following the transmission of the data, the end of message signal and the call termination signal.
15. The method according to claim 14, wherein the termination signal is a single dual tone multi-frequency (DTMF) signal corresponding to a single key of said wireless telephone.

16. The method according to claim 15, wherein said single dual tone multi-frequency (DTMF) signal corresponds to a pound key of said wireless telephone.

17. The method according to claim 13, wherein said transmission of said data occurs over a traffic channel.

18. The method according to claim 14, further comprising transmitting the data and the termination signal over a traffic channel.

19. The method according to claim 13, further comprising: automatically terminating the connection following a predetermined timeout period following transmission of the data.

20. The method according to claim 13, further comprising: automatically terminating the connection following a predetermined timeout period following the transmission of the data and the termination signal.

21. A computer program product comprising a computer useable medium having computer program logic recorded thereon for enabling a processor contained in a wireless telephone to provide data stored in a memory location of the wireless telephone over a connection, said computer program logic comprising:

   accessing means for enabling the processor to access a destination location for a called party;

   memory access means for enabling the processor to automatically access the memory location in which the data is stored upon receipt of a request from said destination location for the data and upon receipt of a predetermined action initiated by a user;
recall means for enabling the processor to recall the data from the accessed memory location;
transmit means for enabling the processor to automatically transmit the recalled data to the destination location; and
further transmit means for enabling the processor to automatically transmit an end of message signal following transmission of the recalled destination location.

22. A wireless telephone comprising a system for providing data stored in a memory location of a wireless telephone over a connection, the system comprising:
access means for accessing a destination location for a called party;
memory access means for automatically accessing the memory location in which the data is stored upon detection of a request from said destination location for the data and upon receipt of a predetermined action initiated by a user;
recall means for recalling the data from the accessed memory location;
transmit means for automatically transmitting the recalled data to the destination location; and
further transmit means for automatically transmitting an end of message signal following transmission of the recalled data.
User accesses remote paging system

User initiates automatic sequence

MIN is retrieved from mobile phone memory

User interface task stores MIN, transmits it to call processing task

Call processing task transmits MIN to base station

Optional: a timer permits automatic disconnection

FIG. 2
Computer System 300

- Processor 304
- Memory 308 (RAM)
- Memory 310 (ROM)
- Removable Storage Drive 314
- Communications Interface 324

Communications Path 326

FIG. 3
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H04Q7/38 H04Q3/72 H04Q7/10

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)

IPC 7 H04Q

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

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

INSPEC, PAJ, WPI Data, EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
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<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
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<tr>
<td>A</td>
<td>WO 97 01252 A (JAMES PETER) 9 January 1997 (1997-01-09) page 9, line 23 - page 10, line 27  page 22, line 13 - page 23, line 28</td>
<td>1,11-13, 21,22</td>
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<td>A</td>
<td>WO 98 49845 A (NORTHERN TELECOM LTD ; KEELER DONALD BRUCE (US); Doshi Sonia  (US)); 5 November 1998 (1998-11-05) page 3, line 9 - line 19 page 11, line 16 - line 29</td>
<td>1,11-13, 21,22</td>
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A 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)

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"8" document member of the same patent family

Date of the actual completion of the international search

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Date of mailing of the international search report

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Form PCT/ISA/210 (second sheet) (July 1992)
## INTERNATIONAL SEARCH REPORT

### Information on patent family members

<table>
<thead>
<tr>
<th>Patent document cited in search report</th>
<th>Publication date</th>
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<tr>
<td>WO 9701252 A</td>
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<td>EP 0979580 A</td>
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Footnote: PCT/IB/210 (patent family annex) (July 1992)