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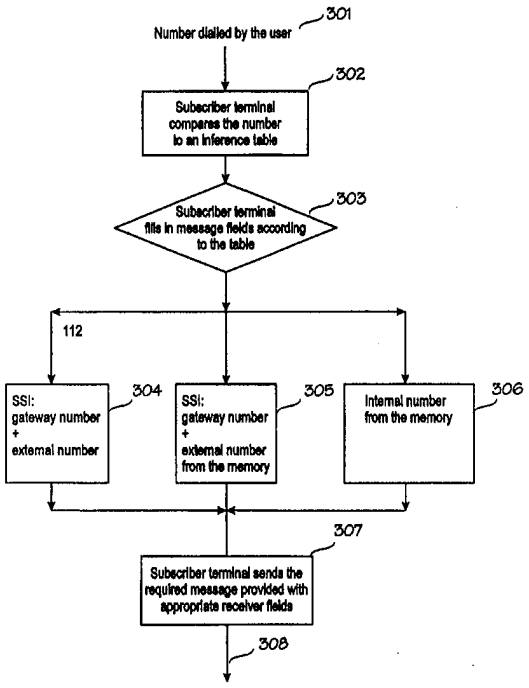
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(57) Abstract

A method for establishing a telecommunication connection between subscriber stations of a first and a second telecommunication system, whereby telecommunication connections are established by dialling (301) a number at a subscriber station of the mobile communication system and by sending a call set–up message from the subscriber station of the mobile communication system, the message comprising a Called Party field and an External Subscriber Number Field. The method comprises: maintaining at the subscriber station of the mobile communication system a memory table, wherein a number that can be dialled by the subscriber station (400) is corresponded to by a gateway number; dialling (301) the number at the subscriber station; fetching (302) from the memory table of the subscriber station the gateway number corresponding to the dialled number; entering (303) the fetched gateway number into the Called Party field of the call set–up message and a number into the External Subscriber Number Field; sending (307) the call set–up message to the mobile communication system; establishing (308) a telecommunication connection between the subscriber station of the first telecommunication system and the subscriber station of the second telecommunication system.



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ESTABLISHING A TELECOMMUNICATION CONNECTION

SCOPE OF THE INVENTION

The invention relates to a method for establishing a telecommunication connection between subscriber stations of a first and a second telecommunication system, the first one being a mobile communication system and the second telecommunication system being connected to said mobile communication system via a gateway provided with a gateway number, whereby telecommunication connections are established by dialling a number at a subscriber station of the mobile communication system and by sending a call set-up message from the subscriber station of said mobile communication system, said message comprising a Called Party field and an External Subscriber Number field.

The invention relates to mobile communication systems, particularly to mobile communication systems comprising for instance exchanges, base stations and radio phones, i.e. mobile stations, or subscribers and subscriber data bases. The structure of the system can be cellular, each cell having then at least one base station, which communicates with at least one mobile station on one or more radio channels.

A method of the invention is meant to be used in particular in what are known as trunking networks, which are typically company networks or private networks used by authorities, where all channels are used either by one or more companies or public authorities.

BACKGROUND OF THE INVENTION

The invention is mainly suitable for mobile communication systems of a digital radio path. The invention is particularly meant to be used in Private Mobile Radio (PMR) networks, i.e. in trunking networks, which are typically company networks or private networks used by authorities, where all channels are used either by one or more companies or public authorities.

A digital PMR mobile communication system is described in the standard *ETS 300 392-1. February 1996. Radio Equipment and Systems (RES); Trans- European Trunked Radio (TETRA); Voice plus Data (V+D); Part 1: General network design. European Telecommunications Standards Institute, (ETSI). Pages 43 - 62* and particularly in the standard *ETS 300 392-2. March 1996. Radio Equipment and Systems (RES); Trans-European Trunked Radio (TETRA); Voice plus Data (V+D); Part 2: Air Interface (AI).*

European Telecommunications Standards Institute, (ETSI). Pages 177 - 179.

In PMR networks subscribers have varying needs as regards subscriber numbering. It is for instance desired that the radio network allows using a same numbering scheme as a company or an organisation uses in its own telephone exchange (Private Automatic Branch Exchange = PABX).

A solution provided by some systems is to transfer the number dialled by the user as such from a subscriber terminal to a network infrastructure, for instance to an exchange, where the actual analysis of the number is performed using complex inference rules, in which for instance leading digits and the length of a number are taken into account.

When using a TETRA subscriber terminal for calling an external system, the subscriber has to dial a gateway number, which is a normal 24-bit TETRA number and, in addition, a number which is used to perform forward dialling in the external system, for instance in a public switched telecommunication network. From the user's point of view, it is not practical that he has to separately dial a seven-digit gateway number and then the external network number, which can be even longer than said seven digits. Dialling would thus become far too laborious, particularly as regards PMR networks where the speed of call set-up is important because the networks are used by public authorities.

BRIEF DESCRIPTION OF THE INVENTION

An object of the invention is to make it easier for a user of a subscriber station of a mobile communication system to dial a number when he is contacting, or wishes to establish a connection to, a subscriber station located in another mobile communication system or in a telecommunication system.

A further object of the present invention is to provide a method and equipment enabling a user of a subscriber station to use in his user interface numbers of other subscriber stations when he wishes to establish a connection to another subscriber station located in the mobile communication system or in another telecommunication system connected to it.

This new type of method is achieved with a method of the invention characterized in that the method comprises the steps of

maintaining at the subscriber station of said mobile communication system a memory table, wherein said number that can be dialled by the

subscriber station is corresponded to by said gateway number;

dialling said number at the subscriber station;

fetching from the memory table of the subscriber station the gateway number corresponding to said dialled number;

entering said fetched gateway number into said Called Party field of said call set-up message and said number into said External Subscriber Number field;

sending said call set-up message to the mobile communication system;

establishing a telecommunication connection between said subscriber station of the first telecommunication system and a subscriber station of the second telecommunication system.

The invention further relates to a method for establishing a telecommunication connection between a first and a second telecommunication system, the first one being a mobile communication system and the second telecommunication system being connected to said mobile communication system via a gateway provided with a gateway number, whereby telecommunication connections are established by dialling a number at the subscriber station of the mobile communication system and by sending a call set-up message from the subscriber station of said mobile communication system, said message comprising a Called Party field and an External Subscriber Number field.

This kind of a method is characterized in that the method comprises the steps of

maintaining at the subscriber station of said mobile communication system a memory table, wherein said number that can be dialled by the subscriber station is corresponded to by said gateway number and by a subscriber number of a subscriber station of the second telecommunication system;

dialling said number at the subscriber station;

fetching from the memory table of the subscriber station the gateway number corresponding to said dialled number and said subscriber number of the subscriber station of the second telecommunication system;

entering said fetched gateway number into said Called Party field of said call set-up message and said subscriber number of the second telecommunication system into said External Subscriber Number field;

sending said call set-up message to the mobile communication system;

establishing a telecommunication connection between said subscriber station of the first telecommunication system and said subscriber station of the second telecommunication system.

The invention further relates to a method for establishing a telecommunication connection in a mobile communication system, whereby telecommunication connections are established by dialling a number at a first subscriber station of the mobile communication system and by sending from the first subscriber station a call set-up message comprising a Called Party field.

This kind of a method is characterized in that the method comprises the steps of

maintaining at the subscriber station of said mobile communication system a memory table, wherein said number that can be dialled by the first subscriber station is corresponded to by a subscriber number of a second subscriber station of the mobile communication system;

dialling said number at the subscriber station;

fetching from the memory table of the subscriber station the subscriber number corresponding to the dialled number;

entering said fetched subscriber number into said Called Party field of said call set-up message;

sending said call set-up message to the mobile communication system;

establishing a telecommunication connection between the first subscriber station and the second subscriber station.

The invention further relates to a subscriber station of a mobile communication system, said subscriber station comprising:

transmission means for sending call set-up messages, which comprise a Called Party field, and other messages;

receiver means for receiving messages;

a user interface, for dialling numbers to establish telecommunication connections;

memory means;

control means for controlling the subscriber station.

The inventive subscriber station is characterized in that said

memory means are arranged to maintain a memory table, wherein a number that can be dialled is corresponded to by a gateway number, which corresponds to a gateway, through which a call from the mobile communication system to a second telecommunication system can be set up, and that the subscriber station comprises:

fetching means, responsive to the number dialled at the mobile communication system, for fetching from said memory table the gateway number corresponding to said number, and

entering means for entering said fetched gateway number into the Called Party field of said call set-up message sent by the subscriber station.

The invention further relates to a subscriber station of a mobile communication system, said subscriber station comprising: transmission means for sending call set-up messages comprising a Called Party field, and other messages;

receiver means for receiving messages;

a user interface, for dialling numbers to establish telecommunication connections;

memory means;

control means for controlling the subscriber station.

The inventive subscriber station is characterized in that said memory means are arranged to maintain a memory table, wherein a number that can be dialled is corresponded to by a subscriber number of a second subscriber station of the mobile communication system, and that the subscriber station comprises

fetching means, responsive to the number dialled at the mobile communication system, for fetching from said memory table the subscriber number of the second subscriber station corresponding to said number, and

entering means for entering said fetched subscriber number into the Called Party field of said call set-up message sent by the subscriber station.

The invention is based on the idea that in the memory means of the subscriber station, i.e. the subscriber terminal, is maintained a memory table, wherein a number dialled in call set-up by the user is corresponded to by a gateway number by which the mobile communication system establishes a connection to a second subscriber station, e.g. to another telecommunication or mobile communication system. In addition to the gateway number, also the subscriber number of the subscriber station of the second telecommunication

system can be stored in the memory table.

So when a user of a subscriber station initiating a call dials a number or another address which is, as mentioned, entered into the memory means, then in a first embodiment of the invention a gateway number corresponding to the dialled number is fetched from the memory; in a second embodiment of the invention said gateway number and a subscriber number of a subscriber station of the second telecommunication system are fetched; and in a third embodiment of the invention a subscriber number of the second subscriber station of the mobile communication system is fetched from the memory.

The information fetched from the memory means are then entered into a call set-up message, which the subscriber station sends. In the first and in the second embodiment of the invention the gateway number fetched from the memory is entered into a Called Party field of the call set-up message. In the first embodiment of the invention the subscriber number of the second telecommunication system dialled by the user of the subscriber station is entered into an External Subscriber Number field. In the second embodiment of the invention the subscriber number of the second telecommunication system fetched from the memory is entered into the External Subscriber Number field of the call set-up message. In the third embodiment of the invention the subscriber number of the second subscriber station of the mobile communication system fetched from the memory is entered into the Called Party field of the call set-up message. The generated call set-up message is then sent to a network infrastructure of the mobile communication system, for instance via a base station to an exchange, where the telecommunication connection is established.

The number dialled by the user of the subscriber station is thus used as an index for the subscriber terminal's internal memory table, from which the subscriber terminal fetches the gateway number, or the gateway number and the subscriber number of the second telecommunication system, or the subscriber number of the second subscriber station of the mobile communication system and enters the number into the appropriate field in the call set-up message.

An advantage of this kind of a method and subscriber station is that they determine the common numbering scheme between the mobile communication system that a subscriber station belongs to and external

systems, in connection with the TETRA specifications.

Another advantage of the invention is that a method according to it enables an external network to be dialled without using any special characters, such as '*' or '#', although the invention also allows these keys to be used, if desired. A further advantage the invention offers is that it has no impact on an internal number analysis of a mobile communication system, of its exchange for instance, whereby said analysis can be kept simple and uniform in different mobile communication networks. Subscriber terminals are then the only members with internal operation deviating from the operation of solutions according to the prior art. This maintains the possibility to use different subscriber terminals, also those of the prior art, in one and the same mobile communication network, with different equipment suppliers producing different parts of the network and the network still remaining uniform, as regards its operations and features, and in accordance with the standard.

An advantage of the invention is that it hardly complicates the planning of the numbering at all. In previously known solutions the planning of the numbering can be fairly complicated because numbers have to be provided with certain structures and lengths. According to the second and the third embodiment of the invention, the number dialled by the user in the mobile communication network can be fully freely selected, because it is no longer used for call set-up. This allows in particular connections to emergency numbers to be established, because in a mobile communication system any number series can thus be defined as an emergency number, and the same number series in particular that is used in the public switched telecommunication network. The number could be e.g. '112' or '000'. This would not be possible in a conventional TETRA network because there a user calling an emergency number would have to dial also the gateway number of the gateway between the TETRA system and (for instance) the public switched telecommunication network. This would naturally be most inconvenient, in an emergency situation in particular. A further aspect to be taken into account is that the TETRA system is a PMR system, which is often used by public authorities. For instance particularly the police or ambulance services often need rapid and easy-to-use facilities for emergency calls.

An advantage of the invention is that it fully conforms to the TETRA specifications. The TETRA specifications provide fairly liberal possibilities for numbering and this solution does not restrict the numbering possibilities.

A further advantage of the invention is that a number entered by the subscriber is not divided or analysed in the mobile communication system, but the mobile communication system only routes the call through the system to the gateway unit provided with an interface to the external telecommunication or mobile communication system. In the third embodiment of the invention, on the other hand, the call to be established is routed directly to the second subscriber station of the mobile communication system. The application of the method of the invention is thus not restricted to a particular numbering solution of a particular organisation, nor does it impose such additional conditions on a number arriving from a radio path that could cause problems of compatibility between subscriber terminals of different suppliers.

An advantage of the invention is also that in a method according to the invention it is sufficient that the user of a subscriber terminal dials in the TETRA system only one, fairly short subscriber number, irrespective of whether the call is destined for the TETRA system or for another telecommunication or mobile communication system connected to it.

BRIEF DESCRIPTION OF THE DRAWINGS

In the following the invention is described in greater detail with reference to the attached drawings, in which

Figures 1A, 1B and 2 show a memory table of the invention located in memory means of a subscriber station.

Figure 3 shows a flow diagram of the operation of a method of the invention.

Figure 4 shows a block diagram of a subscriber station of the invention.

DETAILED DESCRIPTION OF THE INVENTION

The invention relates to a mobile communication system, i.e. a radio phone system, according to the TETRA specifications and to its subscriber terminals, i.e. subscriber stations, such as mobile stations, line stations or dispatchers. Methods according to a first and a second embodiment of the invention are used when a TETRA radio phone network is connected to a public switched telecommunication network and/or to exchanges or to a second mobile communication network, which can also be another TETRA network. A third embodiment of the invention can be used when a user of a subscriber station wishes to establish a connection to a second subscriber

station of the mobile communication system.

The invention is particularly meant for mobile communication systems in which a common numbering scheme is used at the exchange and in the TETRA radio phone system. A subscriber terminal can then, according to the invention, address a connection to be established to a correct destination on the basis of a number dialled by the user and fill in signalling fields of a call set-up message according to the TETRA specifications in such a way that the subscriber does not need to indicate the target network separately in the user interface.

A TETRA subscriber terminal according to the invention comprises a table from which the subscriber terminal is able to fetch, using the number dialled by the user as an index, a gateway number and to enter it into a Called Party field of a call set-up message.

When necessary, the subscriber terminal is also able to enter the number dialled by the user into an External Subscriber Number field of the call set-up message or, in a third embodiment of the invention, the subscriber station is able to enter the subscriber number fetched from the memory table into the Called Party field of the call set-up message it sends.

In the first and in the second embodiment of the invention, the call is thus routed to a gateway which can be a normal TETRA address. An external number is also sent as separate data to the gateway unit, which is then able to use it for dialling in the second telecommunication system.

The invention thus relates to a feature of the subscriber terminal which the subscriber terminal is able to use, when the subscriber dials only one number that can be made compatible for instance with the numbering of the automatic branch exchange of a user organisation, to correctly fill in the fields of the call set-up message to be sent from the subscriber station and to hide, in a way, the gateway dialling or the entire subscriber number to be dialled from the user in such a way that the user does not need to separately dial either the gateway number or, if he so wishes, the subscriber number of the subscriber B. Instead, it is sufficient that the user dials a predetermined number series, e.g. '112' or '000', which can be, if desired, the real number of the subscriber B. This applies to the first embodiment of the invention.

In this invention, the normal analysis of a number dialled by the user is thus not performed in the mobile communication network, because the subscriber terminal is able to use its internal memory table to divide the

number into correct message fields in such a way that the system only routes, when necessary, the call on the basis of the number to the desired gateway unit and sends, when necessary, the external number to be used as data for dialling in an external telecommunication system.

Figure 1A shows a memory table of the first embodiment of the invention located in the memory means of the subscriber station. The table illustrates a situation where the number dialled by the user acts as an index to the table.

The first column of the table shows the number, in this example '112' and '000' dialled by the subscriber. According to the first embodiment of the invention, these numbers are corresponded to by the gateway numbers of the gateways between the mobile communication system and the second telecommunication system, said gateway numbers being shown in the second column of the table. The second column of the table shows the information to be entered into the Called Party field of the call set-up message to be sent, i.e. in a case according to the invention, the gateway number of an external telecommunication system. The external telecommunication system can be a Public Switched Telephone Network (PSTN), or a gateway number leading to a PABX exchange of a company or an organisation.

Figure 1B shows a memory table of the second embodiment of the invention located in the memory means of a subscriber station.

The first column of the table shows the number, in this example '100' and '200' dialled by the subscriber. According to the second embodiment of the invention, these numbers are corresponded to by the gateway numbers of the gateways between the mobile communication system and the second telecommunication system, said gateway numbers being shown in the second column of the table. In addition, in the third column of the table in Figure 1B, the numbers dialled by the subscriber are corresponded to by subscriber numbers of a subscriber of the second telecommunication system, i.e. the subscriber numbers of the subscriber B.

Figure 2 shows a memory table according to the third embodiment of the invention located in the memory means of a subscriber station.

The first column of the table shows the number, in this example '100' and '200', dialled by the subscriber. According to the third embodiment of the invention, in the second column of the table the numbers are corresponded to by the subscriber numbers of the second subscriber in the

same mobile communication system, i.e. the subscriber numbers of the subscriber B. In this case the number '112' corresponds to the number '100' and the number '000' corresponds to the number '200'.

Figure 3 shows a flow diagram of the operation of a method of the invention. In the methods of the two first embodiments of the invention, a telecommunication connection is established between subscriber stations of a first and a second telecommunication system, the first one being a mobile communication system and the second telecommunication system being connected to said mobile communication system via a gateway provided with a gateway number. Said mobile communication system is for instance a mobile communication system according to the TETRA specifications and the second telecommunication system is for instance a public switched telephone network, a company exchange or a mobile communication system not conforming to the TETRA specifications. In the method telecommunication connections are established in such a way that a user of a subscriber station of the mobile communication system dials 301 a number, i.e. typically a number series.

Connections are usually established by sending a call set-up message from the subscriber station of said mobile communication system, said message comprising a Called Party field and, optionally, an External Subscriber Number field.

In the inventive method at the subscriber station of the mobile communication system is maintained a memory table (see Figures 1A, 1B and 2), wherein a number that has been or can be dialled by the subscriber station is corresponded to, in the first and in the second embodiment, by a gateway number and, in the third embodiment, a subscriber number of a second subscriber station of the mobile communication system.

In the method, the subscriber station, i.e. the subscriber terminal, fetches 302, after step 301, in step 302 from the memory table of the subscriber station the gateway number corresponding to said dialled number. The subscriber station compares, in a way, the number dialled by the user to the numbers in the memory of the subscriber station and upon finding the equivalent number, it dials the gateway corresponding to it. In the first and in the second embodiment of the invention, the subscriber station dials the gateway number and enters it into the Called Party field of the call set-up message. In the second embodiment of the invention the subscriber number of

the subscriber station of the second telecommunication system is fetched, in addition to the gateway number, from the memory means, said subscriber number being entered into the External Subscriber Number field of the call set-up message. And in the third embodiment of the invention, the subscriber number of the second subscriber station of the mobile communication system corresponding to the number entered by the user is fetched from the memory. The subscriber number is then entered into the Called Party field of the call set-up message.

In the method the fetched gateway number and/or subscriber number are/is thus entered 303 into the Called Party field of the call set-up message and the subscriber number of the dialled second telecommunication system into the External Subscriber Number field of the call set-up message.

This procedure is described in greater detail in steps 304, 305, 306.

The step 304 illustrates the first embodiment of the invention, in which the subscriber dials the gateway number in the comparison phase 302 and enters it into the Called Party field of the call set-up message. This is illustrated in the step 304 in Figure 3, which shows that the subscriber has, in the step 301, dialled the emergency number 112, the gateway number corresponding to it being fetched in the steps 302 and 303 from the memory means of the subscriber station. The gateway number is entered into the Called Party field of the call set-up message. At the same time also the number '112' dialled by the user is entered into the External Subscriber Number field of the call set-up message.

The step 305 illustrates the second embodiment of the invention, in which the subscriber station dials, in the comparison step 302, the gateway number and enters it into the Called Party field of the call set-up message. This is illustrated in the step 305 in Figure 3, which shows that the subscriber has dialled in the step 301 a number, the gateway number corresponding to it and a subscriber number of a subscriber station of the second telecommunication system being fetched in the steps 302 and 303 from the memory means of the subscriber station. The gateway number is entered into the Called Party field of the call set-up message and the subscriber number is entered into the External Subscriber Number field.

The step 306 illustrates the third embodiment of the invention, in which the subscriber station dials in the comparison phase 302 the subscriber number of the second subscriber station of the mobile communication system

corresponding to the number dialled by the user and enters it into the Called Party field of the call set-up message.

All the above alternatives involve the sending 307 of a generated call set-up message to the mobile communication system, for instance via a base station to an exchange, or via line connections to an exchange, if the subscriber station is a line station.

The mobile communication system then establishes 308 a telecommunication connection between the first subscriber station and the second subscriber station.

It is to be noted that the subscriber station to be used in the invention can be a mobile station or a radio phone. The subscriber station can also be a line station connected to the system by line connections, or a dispatcher.

It is also to be noted that the number series entered by the user is only an address, which can equally well include any other number, a letter or a special character whatsoever, such as '§', '%', '&', '?', or '+' or '-' or some other character. The International Telecommunications Union (ITU) has defined in the recommendation ITU-T E.161 the characters recommended to be used in telecommunication traffic. In the TETRA system the letters A, B, C or D in particular can be used. They are defined in the ETSI recommendation ETR-294 of August 1996, which describes the basic principles of user interfaces (Man Machine Interfaces) of the TETRA mobile communication system. The standard defines two different subscriber interfaces or keypad descriptions - a standard version and an enhanced version, in which the above letters are mentioned.

Figure 4 shows a block diagram of a subscriber station, in this case a radio unit, of the invention. The Figure shows a typical radio unit 400, i.e. a radio phone, a mobile station or for instance a subscriber station, used by the subscriber. The radio unit can also function as a repeater station, if it has two transmitter or transceiver units. The function of a transceiver (TX/RX) 401 is to tune to a radio channel used at a particular time. To the transceiver 401 is connected an antenna 402, which is connected to a radio path RP. Usually, radio frequencies in the range of 60 to 1000 MHz (VHF and UHF ranges) are used, but other frequencies are also possible.

A radio path transmission can also be digital, as for instance in systems according to TETRA specifications.

A user interface 405 comprises electroacoustic transducer means, typically a headphone 406 and a microphone 407, and optionally buttons for initiating and ending a call, and for dialling. Since in a trunking system a call on the radio path RP is advantageously simplex, the subscriber station usually also has a push-to-talk button that must be depressed for the duration of a speech item. The push-to-talk button is not shown in Figure 4.

The function of a controller 403 is to control the operation of the radio unit. The controller 403 is connected to the user interface 405, from which it receives signals e.g. for initiating and ending a call. The controller 403 can also give the user, via the user interface 405, acoustic or visual signals that relate to the operation of the radio phone and/or the radio phone system.

The controller 403 is connected to the transceiver TX/RX 401. The transceiver comprises a transmitter Tx and a receiver Rx. The transceiver uses a channel allocated by the controller 403, i.e. the transceiver 401 tunes to the channel, i.e. to a radio frequency and a suitable time slot, allocated by the controller 403. The radio unit of the invention is able to tune to a direct mode channel. The transceiver 401 is also activated by the controller 403. The controller 403 receives and sends signalling messages through the transceiver 401. The radio unit 400 of the invention can be used for instance in a mobile communication system, i.e. in a radio system, that comprises a radio network with at least one exchange, base station and subscriber stations, and possibly one or more repeater stations, which relay traffic between the at least one base station and the subscriber stations communicating on the direct mode channel. Said radio unit comprises a transceiver 401 for receiving transmissions sent by other radio units and for sending transmissions to said other radio units, a control unit 403 for controlling the operations of the radio unit and a user interface 405. The radio unit also comprises a memory means 409 for storing the data needed in the radio unit.

In the radio unit 400 of the invention the memory means 409 are arranged to maintain the memory table according to the invention (Figures 1A and 1B), wherein the number that can be dialled is corresponded to by a gateway number, which corresponds to a gateway through which a call from a mobile communication system to a second telecommunication system can be set up.

The subscriber station of the invention further comprises fetching means 410, responsive to the number dialled at the mobile communication

system, for fetching from the memory table 409 the gateway number corresponding to the number, and entering means 411 for entering the fetched gateway number into the Called Party field of said call set-up message sent by the subscriber station 400.

In the first embodiment of the invention the entering means 411 are arranged to enter the dialled number into the External Subscriber Number field of the call set-up message.

In a solution according to the second embodiment of the invention the memory table (Figure 1B; 409) of the subscriber station includes, in addition to the gateway number, the subscriber number of the second telecommunication system corresponding to the number that can be dialled. The entering means 411 are then arranged to enter, in addition to the gateway number, the subscriber number of the subscriber station of the second telecommunication system into the External Subscriber Number field of the call set-up message.

In the third embodiment of the invention, the memory means 409 are arranged to maintain a memory table (Figure 2), in which the number that can be dialled is corresponded to by the subscriber number of the second subscriber station of the mobile communication system.

The subscriber station of the invention further comprises fetching means 410, responsive to the number dialled at the mobile communication system, for fetching from said memory table 409 (Figure 2) the subscriber number of the second subscriber station corresponding to said number, entering means 411 for entering said dialled subscriber number into the Called Party field of said call set-up message sent by the subscriber station 400.

The drawings and the related description are only meant to illustrate the idea of the invention. The details of a solution according to the invention can vary within the scope of the claims. Although the invention is described above mainly in connection with a TETRA mobile communication system, the invention can be used also in other kinds of mobile communication systems with a similar call set-up message.

CLAIMS

1. A method for establishing a telecommunication connection between subscriber stations of a first and a second telecommunication system, the first one being a mobile communication system and the second telecommunication system being connected to said mobile communication system via a gateway provided with a gateway number, whereby telecommunication connections are established by dialling (301) a number at a subscriber station (400) of the mobile communication system and by sending a call set-up message from the subscriber station (400) of said mobile communication system, said message comprising a Called Party field and an External Subscriber Number field, characterized in that the method comprises the steps of

maintaining at the subscriber station of said mobile communication system a memory table (409, Figure 1A), wherein said number that can be dialled by the subscriber station (400) is corresponded to by said gateway number;

dialling (301) said number at the subscriber station (400);

fetching (302) from the memory table (409; Figure 1A) of the subscriber station (400) the gateway number corresponding to said dialled number;

entering (303; Figure 3) said fetched gateway number into said Called Party field of said call set-up message and said number into said External Subscriber Number field (304);

sending (307) said call set-up message to the mobile communication system;

establishing (308) a telecommunication connection between said subscriber station (400) of the first telecommunication system and a subscriber station of the second telecommunication system.

2. A method for establishing a telecommunication connection between subscriber stations of a first and a second telecommunication system, the first one being a mobile communication system and the second telecommunication system being connected to said mobile communication system via a gateway provided with a gateway number, whereby telecommunication connections are established by dialling (301) a number at a subscriber station (400) of the mobile communication system and by sending a call set-up message from the subscriber station (400) of said mobile

communication system, said message comprising a Called Party field and an External Subscriber Number field, characterized in that the method comprises the steps of

maintaining at the subscriber station of said mobile communication system a memory table (409; Figure 1B), wherein said number that can be dialled by the subscriber station (400) is corresponded to by said gateway number and by a subscriber number of a subscriber station of the second telecommunication system;

dialling (301) said number at the subscriber station (400);

fetching (302) from the memory table (409; Figure 1B) of the subscriber station (400) the gateway number corresponding to said dialled number and said subscriber number of the subscriber station of the second telecommunication system;

entering (303; Figure 3) said fetched gateway number into said Called Party field of said call set-up message and said subscriber number of the second telecommunication system into said External Subscriber Number field (305);

sending (307) said call set-up message to the mobile communication system;

establishing (308) a telecommunication connection between said subscriber station (400) of the first telecommunication system and said subscriber system of the second telecommunication system.

3. A method for establishing a telecommunication connection in a mobile communication system, whereby telecommunication connections are established by dialling (301) a number at a first subscriber station (400) of the mobile communication system and by sending from the first subscriber station (400) a call set-up message comprising a Called Party field, characterized in that the method comprises the steps of

maintaining at the subscriber station of said mobile communication system a memory table (409; Figure 2), wherein said number that can be dialled by the first subscriber station is corresponded to by a subscriber number of a second subscriber station of the mobile communication system;

dialling (301) said number at the subscriber station (400);

fetching (302) from the memory table (409; Figure 2) of the subscriber station (400) the subscriber number corresponding to said dialled number;

entering (303; Figure 3) said fetched subscriber number into said Called Party field (306) of said call set-up message;

sending (307) said call set-up message to the mobile communication system;

establishing (308) a telecommunication connection between the first subscriber station (400) and the second subscriber station.

4. A method according to any one of claims 1, 2 or 3, characterized in that said number can also include other characters than numbers.

5. A method according to any one of claims 1, 2, 3 or 4, characterized in that said number can include at least one of the following characters:

- a number;
- a character '#';
- a character '*';
- a character '+' or '-';
- a letter;
- a special character.

6. A subscriber station of a mobile communication system comprising

transmission means (401/Tx) for sending call set-up messages, which comprise a Called Party field, and other messages;

receiver means (401/Rx) for receiving messages;

a user interface (405) for dialling numbers to establish telecommunication connections;

memory means (409);

control means (403) for controlling the subscriber station (400), characterized in that

said memory means (409) are arranged to maintain a memory table (Figures 1A and 1B), wherein a number that can be dialled is corresponded to by a gateway number, which corresponds to a gateway through which a call from a mobile communication system to a second telecommunication system can be set up, and that said subscriber station (400) comprises:

fetching means (410), responsive to the number dialled in the dialling (301) of the mobile communication system, for fetching from said memory table the gateway number corresponding to said number, and

entering means (411) for entering said fetched gateway number into the Called Party field of said call set-up message sent by the subscriber station (400).

7. A subscriber station (400) according to claim 6, characterized in that

said entering means (411) are arranged to enter said number into the Called Party field of said call set-up message.

8. A subscriber station (400) according to claim 6, characterized in that

said memory table (409, Figure 1B) includes a subscriber number of the second telecommunication system, said number corresponding to the number that can be dialled, and that

said entering means (411) are arranged to enter said subscriber number of a subscriber station of the second telecommunication system into the Called Party field of said call set-up message.

9. A subscriber station (400) of a mobile communication system comprising

transmission means (401/Tx) for sending call set-up messages, which comprise a Called Party field, and other messages;

receiver means (401/Rx) for receiving messages;

a user interface (405), for dialling numbers to establish telecommunication connections;

memory means (409);

control means (403) for controlling the subscriber station, characterized in that

said memory means (409) are arranged to maintain a memory table (Figure 2), wherein a number that can be dialled is corresponded to by a subscriber number of a second subscriber station of the mobile communication system, and that said subscriber station (400) comprises:

fetching means (410), responsive to the number dialled at the mobile communication system, for fetching from said memory table (409, Figure 2) the subscriber number of the second subscriber station corresponding to said number, and

entering means (411) for entering said fetched subscriber number into the Called Party field of said call set-up message sent by the subscriber station (400).

Number	Gateway number
112	1000002
000	1000003

Fig. 1A

Number	Gateway number	Number of subscriber B
100	1000002	112
200	1000003	000

Fig. 1B

Number	Number of subscriber B
100	112
200	000

Fig. 2

Fig. 4

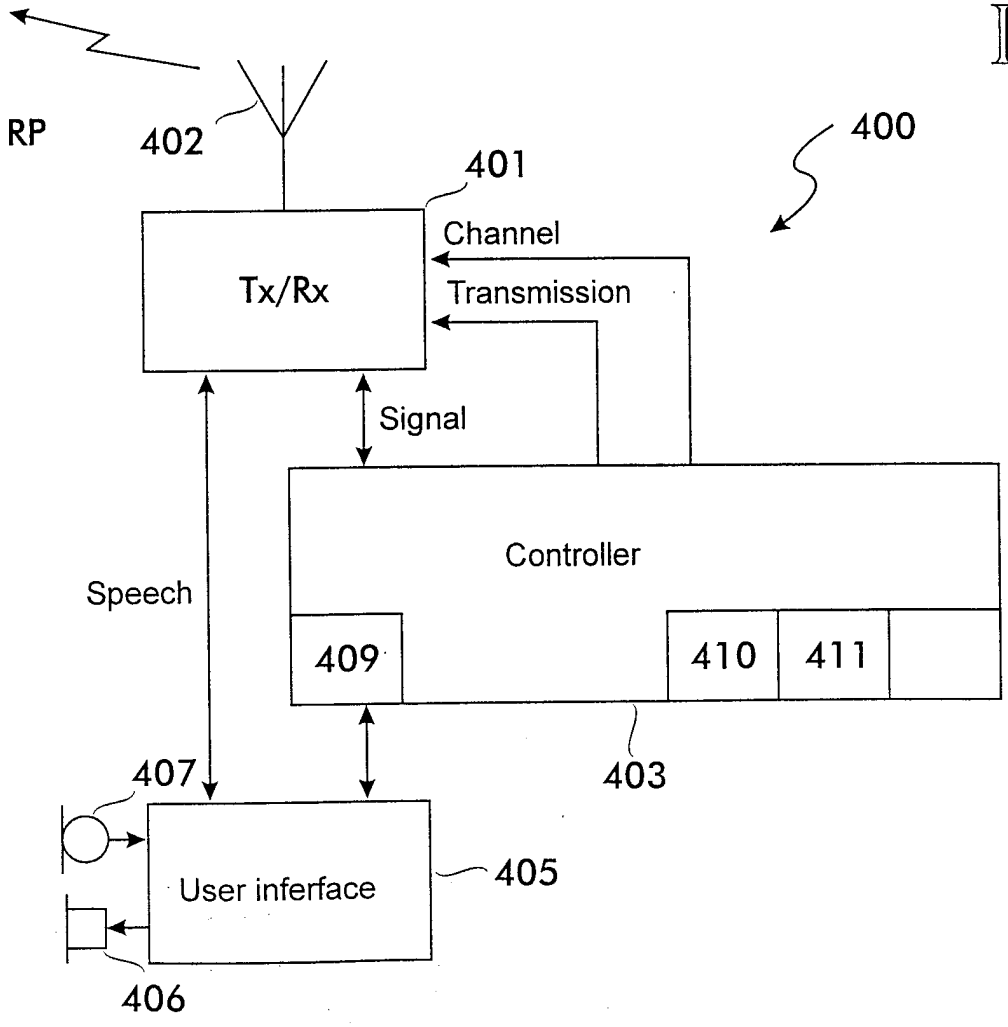
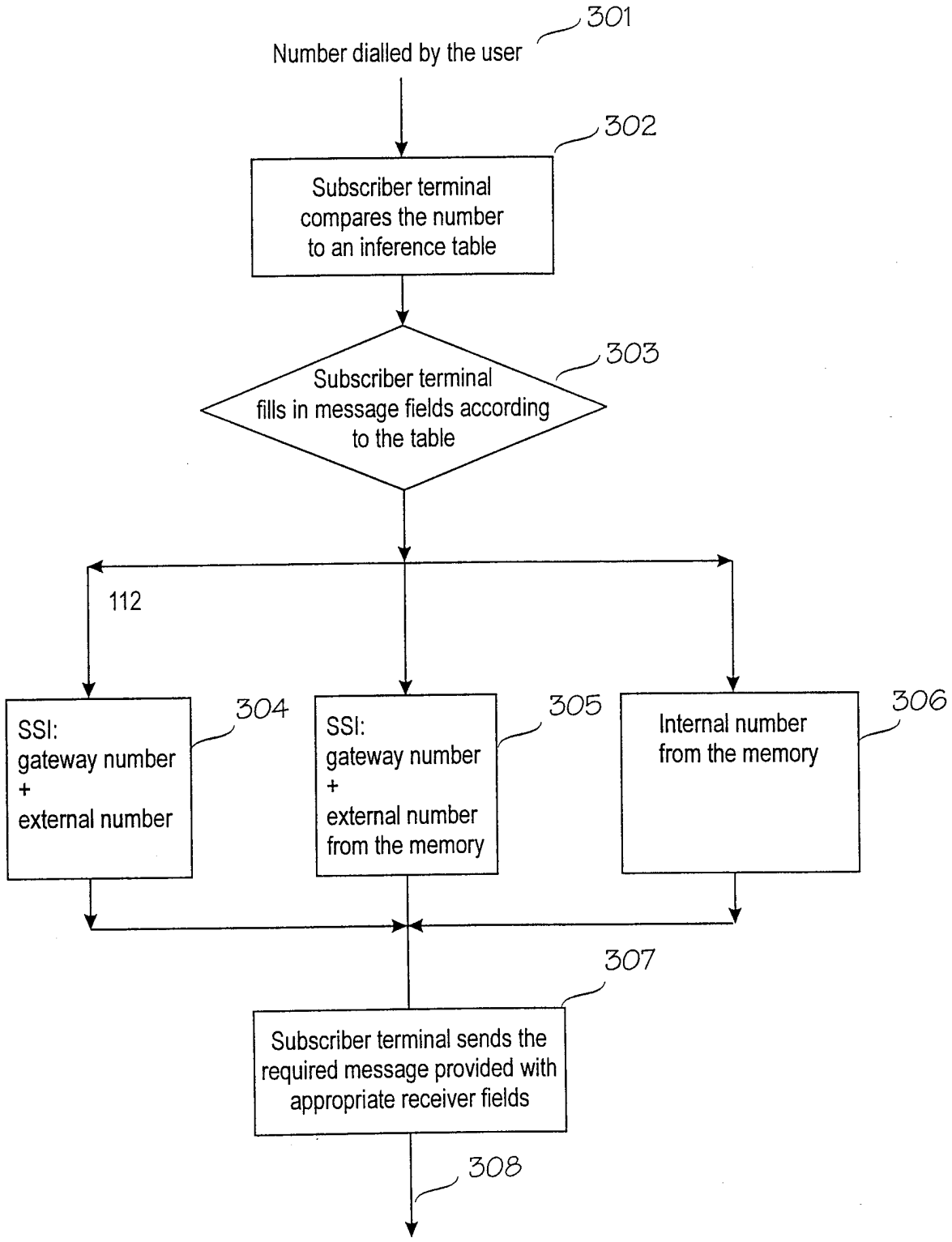


Fig. 3


301
Number dialled by the user
302
Subscriber terminal compares the number to an inference table
303
Subscriber terminal fills in message fields according to the table
112
304
SSI: gateway number + external number
305
SSI: gateway number + external number from the memory
306
Internal number from the memory
307
Subscriber terminal sends the required message provided with appropriate receiver fields
308