Determining the status of a called mobile communication device at call initiation

During initiation of a call, a calling mobile telephone determines the status of a called mobile telephone from data sent from the called mobile telephone or from a server database in the network. The status information may comprise a unique code which defines the call alert mode set in the called mobile telephone. The call alert mode may be one or more of musical tones, vibrating alert or lighting indicator. The calling mobile telephone may be arranged to imitate the call alert of the called mobile telephone. The caller is thus made aware of the ring tone set in the called mobile telephone and may purchase the ring tone if desired.
**Initiate call to intended recipient**

**S301**

**Insert activation code into UUI of SETUP message**

**S303**

**Forward SETUP message to intended recipient via Air Interface**

**S305**

**Is intended recipient contactable?**

**S307**

**Yes**

**Intended recipient's phone inserts a call receiving mode identifier into UUI of ALERTING message**

**S313**

**ALERTING message is forwarded to caller's phone**

**S315**

**Caller's phone reads identifier within UUI in ALERTING message**

**S317**

**Caller's phone imitates call receiving mode of recipient's phone**

**S319**

**Intended recipient answers?**

**S321**

**Yes**

**Caller has conversation with recipient**

**S327**

**End call**

**S329**

**No**

**Forward call to answer phone service**

**S323**

**S325**

**Does caller already have recipient's ring tone?**

**S333**

**Yes**

**END**

**S335**

**No**

**OPTION provided to buy ring tone**

**S337**

**END**

**S339**
Fig. 5

1. **Initiate call to intended recipient** (S501)

2. **Activation code is inserted into UUI of SETUP message** (S503)

3. **Forward SETUP message to intended recipient via Air Interface** (S505)

4. **Network intercepts SETUP message** (S507)

5. **Is intended recipient contactable?** (S509)
   - **Yes** (Go to step S313) (S511)
   - **No** (S513)

6. **Network identifies intended recipient and accesses database entry for recipient's phone** (S513)

7. **Network determines call receiving mode identifier from the database entry for recipient's phone** (S513)

8. **Network inserts identifier into UUI of ALERTING message** (S515)

9. **Network forwards ALERTING message to caller's phone** (S517)

10. **Forward call to answer phone service** (S519)

11. **Go to step S317** (S521)

12. **END** (S523)
IMPROVEMENTS IN MOBILE COMMUNICATION DEVICES

The present invention relates to improvements in mobile communication devices and in particular to a method and apparatus for determining the status of a mobile communication device.

When mobile telephone users call other users of such devices, their intent is usually to speak to the other party. It is known for a network to provide information on whether an intended recipient has their mobile telephone switched off, or is not located within a reception area, as shown in European patent application EP1071295. However, a user maybe unable to get in contact with an intended recipient for other reasons. It can also be the case that the intended recipient of the call has their mobile telephone placed in a mode such that they are not made aware of the call. For example, when a call is being received by the recipient's phone, a sufficient ringing volume or audible tone may not be produced. One typical scenario is when an intended recipient of a call has their mobile telephone placed in vibrate alert mode within a bag, and so are unaware that someone is trying to contact them as they cannot feel the phone vibrating.

This results in the caller not being able to get in direct contact with the intended recipient. Additionally, the caller is not made aware of any possible reasons why the intended recipient is not answering the call.

Also, many users of mobile communication devices, such as mobile telephones, like to regularly change their incoming call alert modes, such as
their ring tones. This can be triggered for example when a user hears a new ring tone being played on someone else’s telephone. However, it is not currently possible for mobile telephone users to be able to determine the type of incoming call alert mode being used by people to whom they are making a call and so users of mobile telephones may not be made aware of a large number of different ring tones that are available for use.

The present invention aims to overcome, or alleviate, some or all of the aforementioned problems.

In one aspect, the present invention provides a mobile communication device comprising a processor, which, during the initialisation of a call to a further mobile communication device, is arranged to determine the status of the further mobile communication device.

In a further aspect, the present invention provides a mobile communication device comprising a processor, which, during the initialisation of a call being received from a further mobile communication device, is arranged to send its status to the further mobile communication device.

In yet a further aspect, the present invention provides a method of using a mobile communication device to determine the status of a further mobile communication device comprising the steps of initialising a call to the further mobile communication device, and determining the further mobile communication device’s status.

In yet a further aspect, the present invention provides a database arranged to store data such that a mobile communication device can receive
the data during the initialisation of a call to a further mobile communication
device, said data being associated with the status of the further mobile
communication device.

In yet a further aspect, the present invention provides a server
arranged to provide data to a mobile communication device upon the mobile
communication device initialising a call to a further mobile communication
device, said data being associated with the status of the further mobile
communication device.

In yet a further aspect, the present invention provides a mobile
communication device comprising a processor, which, during the initialisation
of a call to a further mobile communication device, is arranged to determine
the status of the further mobile communication device, wherein the processor
extracts data associated with the status of the further mobile communication
device from data sent by the further mobile communication device during
initialisation of the call.

The present invention provides the advantage of allowing users of a
mobile communication device to be able to determine the status of mobile
communication devices being used by fellow users, such that the users may
change the status of their mobile communication device so it is the same as
the status of fellow user's mobile communication devices.

The present invention provides the further advantage of having a
mobile communication device which is able to determine the status, such as
the incoming call alert mode, of an intended recipient's mobile
communication device so that the user may attempt to contact the recipient in
other ways if the incoming call alert mode is set in such a way that the
recipient may not be able to hear the mobile telephone ringing.

Specific embodiments of the present invention will now be described
by way of example only, with reference to the accompanying drawings, in
which:

Figure 1 shows a block diagram of a mobile telephone according to a
first embodiment of the present invention;

Figure 2 shows a pictorial representation according to a first
embodiment of the present invention;

Figure 3 shows a flow diagram according to a first embodiment of the
present invention;

Figure 4 shows a pictorial representation according to a second
embodiment of the present invention;

Figure 5 shows a flow diagram according to a second embodiment of
the present invention.

**FIRST EMBODIMENT**

Figure 1 shows a block diagram of a mobile telephone system
according to a first embodiment of the present invention.

The mobile telephone 100 includes a transmitting and receiving device
101 for sending and receiving data via a wireless communication channel
utilising a system such as, for example, UMTS, GPRS or GSM. The device
further includes a smart card 103, such as a SIM (subscriber identity module),
a memory storage device 105, such as an E²PROM, and a processor 107. All these components are connected to a power supply 109, such as a battery. All of the above components work in conjunction with each other in order for a user to communicate with other mobile telephones.

Figure 2 shows a pictorial representation of the first embodiment according to the present invention. A user of a mobile telephone 100 initiates a call to an intended recipient's mobile telephone 200. A call initiating signal (SETUP signal) 201 is sent from the caller's mobile telephone 100 via the air interface 205 to the intended recipient's mobile telephone 200. The SETUP signal 201 passes transparently through the network to the mobile telephone 200. The intended recipient's mobile telephone 200 then returns an ALERTING signal 203 to the caller's mobile telephone 100 via the air interface 205, again passing transparently through the network.

The mobile telephones 100 and 200 both include a menu option within the setup parameters of the telephone. The menu option allows a user to select or deselect an "ACTIVATE UUI" option. The UUI (User to User Information) is data that can be inserted into a SETUP or ALERTING signal, as is shown in the standard 3GPP TS 24.008. Other applicable standards are 3GPP TS 24.087 and 3GPP TS 22.087.

If the caller's mobile telephone 100 has the option "ACTIVE UUI" selected, during the initiation of the call and the creation of the SETUP message the processor 107 inserts an activation code into the UUI element of the SETUP signal. When the recipient's mobile telephone 200 receives the
SETUP signal, if the recipient's mobile telephone 200 also has the option 'ACTIVE UUI' selected, the processor within the recipient's mobile telephone 200 detects the activation code within the UUI of the SETUP message, and inserts a code within the ALERTING message identifying the type of incoming call alert mode being used by the recipient's mobile telephone 200.

Upon the caller's mobile telephone 100 receiving the ALERTING message, the processor in the caller's mobile telephone 100 extracts the code relating to the incoming call alert mode from the UUI within the ALERTING message and imitates the incoming call alert mode of the recipient's mobile telephone 200.

Figure 3 shows a flow diagram showing the steps according to this embodiment of the present invention. At step S301 the caller initiates a call to the intended recipient. When the call is being initiated, an activation code is inserted into the UUI of the SETUP message at step S303 indicating that the option 'ACTIVE UUI' has been selected on the caller's mobile telephone.

Next, the SETUP message is forwarded to the intended recipient's mobile telephone via the air interface S305. If the intended recipient is not contactable at step S307, for example if the mobile telephone is out of range or the device is switched off, the call is forwarded to the intended recipient's answer phone service at step S309. The sequence then ends at S311.

If however the intended recipient is contactable at step S307, the recipient's mobile telephone receives the SETUP message and, in response to this, the processor inserts an incoming call alert mode identifier, as described
below, into the UUI of the ALERTING message at step S313. Step S313 is only carried out if the intended recipient's mobile telephone has the 'ACTIVE UUI' option selected.

Each mobile telephone has a predefined number of incoming call alert modes. For example, the mobile telephone may be set up to be in a vibration mode upon receiving a call, a ringing mode, a combination of vibration and ringing modes, a lighting mode activating different LEDs, or any other combination of vibration, ringing and lighting modes. Additionally, there may be a number of different vibration modes for identifying the caller attempting to contact the mobile telephone. Also, different ringing tones may be used for different calls being received, as may different lighting modes. Therefore, a unique code is used to define the type of incoming call alert mode in which the mobile telephone is set. This unique code includes a code identifying the type of vibrating, lighting or audible tone being used. This unique code is the call receiving mode identifier that is inserted into the UUI of the ALERTING message.

At step S315, the ALERTING message is forwarded to the caller's mobile telephone. When the caller's mobile telephone receives the ALERTING message, the processor 107 extracts the incoming call alert mode identifier from the UUI of the ALERTING message, at step 317.

The caller's mobile telephone determines from the incoming call alert mode identifier the status of the incoming call alert mode of the intended recipient's mobile telephone. If the caller's mobile telephone has the same
incoming call alert modes available for use, then it imitates the incoming call alert mode of the recipient's mobile telephone, at step S319.

If the intended recipient does not answer the telephone as step S321, the call is forwarded to an answer phone service at step S323 upon which the sequence ends at step S325.

If the intended recipient answers the call at step S321, then the caller has a conversation with the recipient at step S327. Upon the termination of the call at step S329, the caller's mobile telephone displays the type of incoming call alert mode being used by the recipient at step S331. If the caller's mobile telephone does not have the same ring tone as the recipient at step S333, an option is provided for the caller to purchase the ring tone being used by the recipient at step S337. The sequence then ends at step S339.

In this manner, it is possible for a caller to determine the status, such as the incoming call alert mode, of an intended recipient's mobile telephone, including any combination and type of vibrating, ringing and lighting alerts. Additionally, the user will be informed of any ringing alert that is being used by the intended recipient on their mobile telephone, thus allowing the caller to purchase the same ringing alert if desired.

SECOND EMBODIMENT

Figure 4 shows a pictorial representation of a second embodiment according to the present invention.

In this embodiment the network provider has a network server 401, and a database 405. Within the database 405 are separate data elements 407
that are used to store incoming call alert mode identifiers. The incoming call alert mode identifiers are of the same type described in the first embodiment. Each of the identifiers is associated with a user of the network. A mobile telephone 400 sends details of its associated incoming call alert mode to the network server 401 via any suitable automatic communication method, such as an automatic SMS (short message service) as is well known in the art. The network server 401 is able to determine the user of the mobile telephone 400 from the data provided in the message and stores the incoming call alert mode identifier into the database 405 as a data element 407 associated with that user. Each time the incoming call alert mode is changed on the mobile telephone 400, an update message 409 is sent to the network server 401 such that the data element 407 is updated.

Therefore, a caller using a mobile telephone 100 can identify the incoming call alert mode of an intended recipient 400 during the initiation of a call, even if the call is not connected, as depicted by the break in communication 415.

Figure 5 shows a flow diagram according to the second embodiment. It is assumed that both the caller and intended recipient have the 'ACTIVE UUI' option selected in their respective set-up menus as described in the first embodiment.

At step S501, the caller initiates a call to the intended recipient. The processor in the caller's mobile telephone inserts an activation code into the UUI of the SETUP message at step 503. The SETUP message 411 is
forwarded to the intended recipient via the air interface 403 at step S505. The network intercepts the SETUP message at step S507, and determines the identification of the intended recipient from the telephone number being used by the caller. The network is thus able to locate a data element 407 stored within the database 405 that is associated with the intended recipient.

Therefore, if the intended recipient is not contactable at step S509, the network is able to identify the intended recipient and access the relevant database entry in the database 405 associated with the recipient's phone 400 at step S513. However, if the intended recipient is contactable at step S509, then the process transfers to step S313 in Figure 3 and continues the process as previously described in the first embodiment.

After step S513, the network determines the incoming call alert mode identifier from the database element 407 stored within the database 405 for the recipient's mobile telephone 400. The network inserts an incoming call alert mode identifier within the UUI of an ALERTING message 413 at step S515, the incoming call alert mode identifier having previously been uploaded to the network database by the intended recipient's mobile telephone.

Subsequently, the call is forwarded to an answer phone service at step S519 wherein the sequence ends at step S521.

When the call is forwarded to the answer phone service, the network also forwards an ALERTING message to the caller's mobile telephone 100 at step 517. The user can then identify the incoming call alert mode of the
recipient's mobile telephone from step S317 as described previously in the first embodiment.

This provides the advantage of determining the status of an intended recipient's mobile telephone during the initialisation of a call even if the recipient's mobile telephone is switched off or out of range.

**FURTHER EMBODIMENTS**

It will be understood that embodiments of the present invention are described herein by way of example only, and that various changes and modifications may be made without departing from the scope of the invention.

It will be understood that the invention may be applied to any mobile communication device in which a user wishes to communicate with another user via a suitable wireless communication means. For example, the mobile communication device may be a mobile telephone or a personal digital assistant with a mobile communication means attached thereto.

It will also be understood that when an alerting tone is identified on a caller's device, that an option may automatically be provided which allows the caller to purchase the tone.

It will also be understood that any status information may be inserted into the alerting message, in order to provide the status information to a user of a mobile communication device.
CLAIMS:

1. A mobile communication device comprising a processor, which, during the initialisation of a call to a further mobile communication device, is arranged to determine the status of the further mobile communication device.

2. The mobile communication device of claim 1 wherein the processor extracts data associated with the status of the further mobile communication device from data sent by the further mobile communication device during initialisation of the call.

3. The mobile communication device of claim 2 wherein the data sent by the further mobile communication device is an alerting message, and the data associated with the status is user to user information inserted within the alerting message.

4. The mobile communication device of claim 2 wherein the data associated with the status is a unique code.

5. The mobile communication device of claim 4 wherein the unique code defines a call alert mode selected from one or more of the following: musical tones; vibrating alert; lighting indicator.
6. The mobile communication device of claim 1 wherein the processor extracts data associated with the status of the further mobile communication device from data transferred from a storage means located at a network server.

7. The mobile communication device of claim 1 wherein the mobile communication device is arranged to imitate the status of the further mobile communication device.

8. The mobile communication device of claim 1 wherein the mobile communication device provides information that identifies the further mobile communication device's ringing alert tone.

9. The mobile communication device of claim 8 wherein the mobile communication device is arranged to acquire the further mobile communication device's ringing alert tone.

10. A mobile communication device comprising a processor, which, during the initialisation of a call being received from a further mobile communication device, is arranged to send its status to the further mobile communication device.
11. The mobile communication device of claim 10 wherein the processor inserts data associated with its status into data sent to the further mobile communication device during initialisation of the call.

12. The mobile communication device of claim 11 wherein the data sent to the further mobile communication device is an alerting message, and the data associated with the status is user to user information inserted within the alerting message.

13. The mobile communication device of claim 11 wherein the data associated with the status is a unique code.

14. The mobile communication device of claim 13 wherein the unique code defines a call alert mode selected from one or more of the following: musical tones; vibrating alert; lighting indicator.

15. The mobile communication device of claim 10 wherein the processor sends data associated with its status to a storage means located at a network server.

16. The mobile communication device of claim 10 wherein the mobile communication device sends information that identifies its ringing alert tone.
17. The mobile communication device of claim 16 wherein the further mobile communication device is arranged to acquire the mobile communication device's ringing alert tone.

18. A method of using a mobile communication device to determine the status of a further mobile communication device comprising the steps of:

- initialising a call to the further mobile communication device, and
- determining the further mobile communication device's status.

19. A method according to claim 18 wherein said determination utilises data associated with the status, said data being sent by the further mobile communication device during initialisation of the call.

20. The method according to claim 19 wherein the data sent by the further mobile communication device is an alerting message, and the data associated with the status is user to user information inserted within the alerting message.

21. The method according to claim 19 wherein the data associated with the status is a unique code.
22. A method according to claim 21 wherein the unique code defines a call alert mode selected from one or more of the following: musical tones; vibrating alert; lighting indicator.

23. A method according to claim 18 wherein said determination utilises data associated with the status, said data being transferred from a storage means located at a network server.

24. The method of claim 18 further comprising the step of imitating the status of the further mobile communication device.

25. The method of claim 18 further comprising the step of providing information that identifies the further mobile communication device's ringing alert tone.

26. The method of claim 25 further comprising the step of acquiring the further mobile communication device's ringing alert tone.

27. A database arranged to store data such that a mobile communication device can receive the data during the initialisation of a call to a further mobile communication device, said data being associated with the status of the further mobile communication device.
28. A server arranged to provide data to a mobile communication device upon the mobile communication device initialising a call to a further mobile communication device, said data being associated with the status of the further mobile communication device.

29. A mobile communication device comprising a processor, which, during the initialisation of a call to a further mobile communication device, is arranged to determine the status of the further mobile communication device, wherein the processor extracts data associated with the status of the further mobile communication device from data sent by the further mobile communication device during initialisation of the call.
Application No: GB0328398.3  |  Examiner: Gareth Griffiths
Claims searched: 1-29  |  Date of search: 27 April 2004

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

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<th>Relevant to claims</th>
<th>Identity of document and passage or figure of particular reference</th>
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<td>X</td>
<td>1,6,18,23,27,28</td>
<td>EP1071295 A2 (PHONE.COM) para 4</td>
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<td>X</td>
<td>1,6,18,23,27,28</td>
<td>GB2346296 A (ERICSSON) pages 8-9</td>
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