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(54) **COMMUNICATION NETWORK TERMINAL SUPPORTING A PLURALITY OF APPLICATIONS**

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(*) Notice: This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

Under 35 U.S.C. 154(b), the term of this patent shall be extended for 0 days.

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(51) **Int. Cl.**[7] **H04Q 7/20**

(52) **U.S. Cl.** **455/466**; 455/517; 709/313

(58) **Field of Search** 455/466, 465, 455/433, 435, 411, 412, 410, 418, 517, 550, 556, 557, 88, 558, 559, 31.3, 38.1, 415; 370/389, 311, 318, 320, 349, 332, 337; 379/93.08, 88.11, 88.12, 357; 709/313, 317, 319, 329; 707/104

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(57) **ABSTRACT**

The present invention relates to a communicator **(1)** having means for displaying and processing an information card containing information, and means for transmitting the information on the information card using radio communication, the transmission including an information card identifier and a destination identifier. The information on the information card is processed into characters, and a short message **(103, 104)** is formed of said characters, to be transmitted using radio communication, and sent to a receiver through a short message service center (SM-SC).

24 Claims, 8 Drawing Sheets

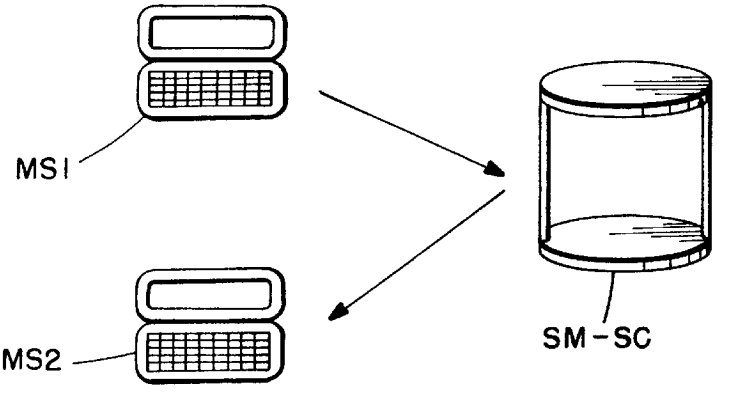

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FIG. 1.

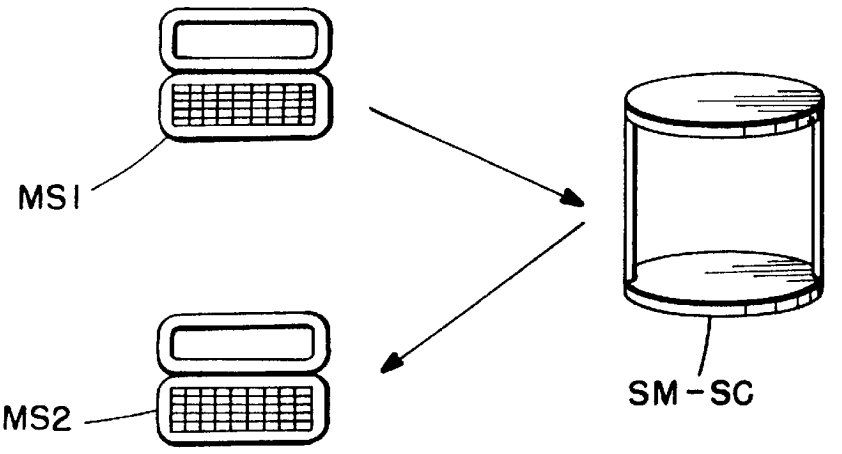


FIG. 2.

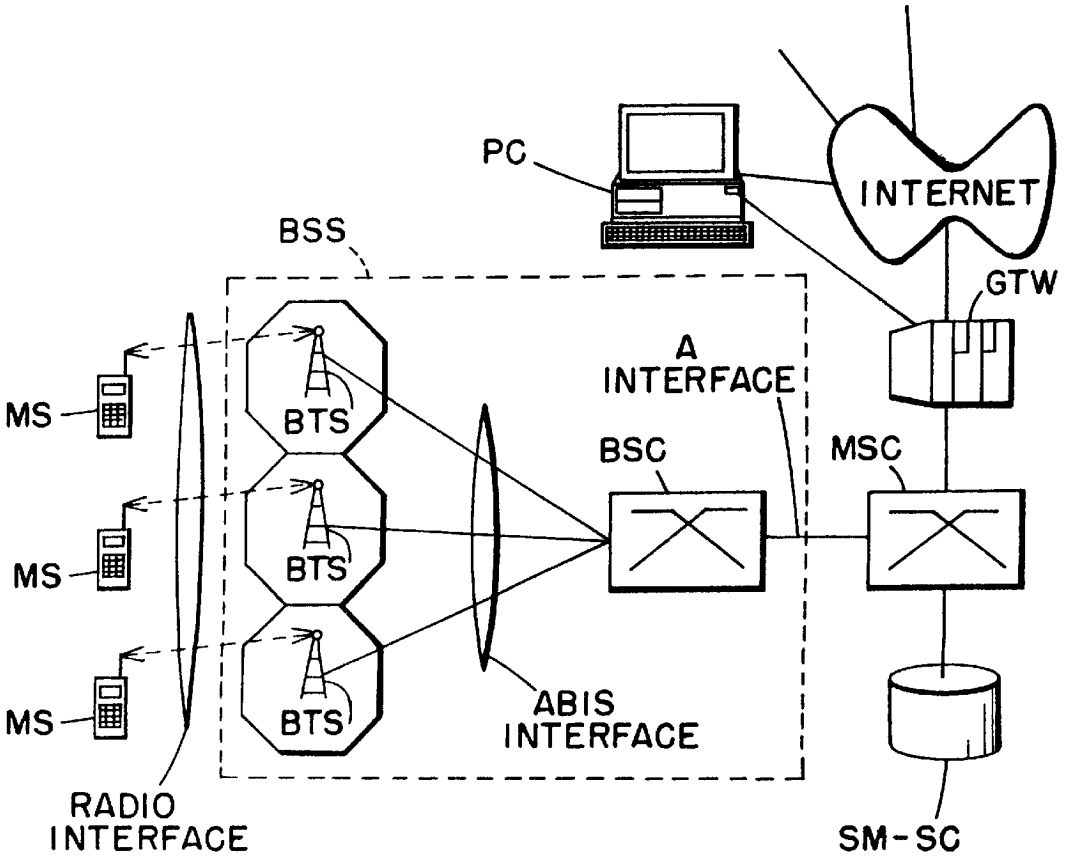


FIG. 3.

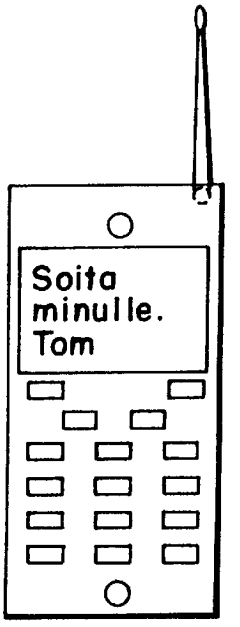


FIG. 4A.

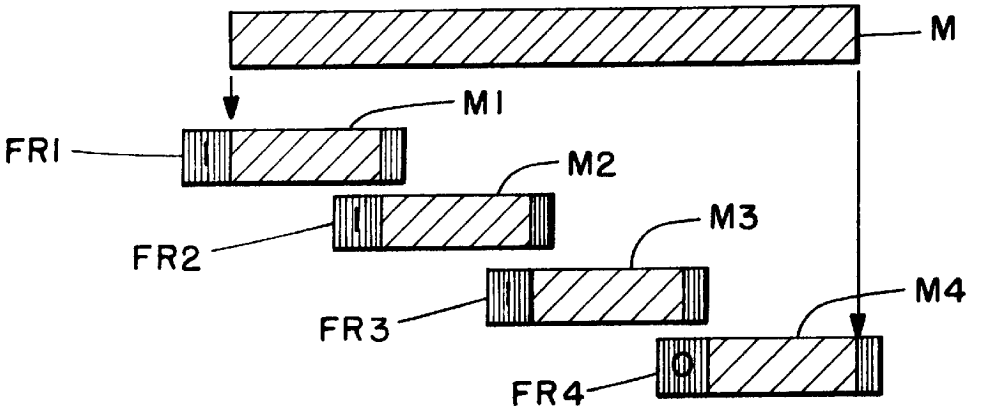


FIG. 4B.

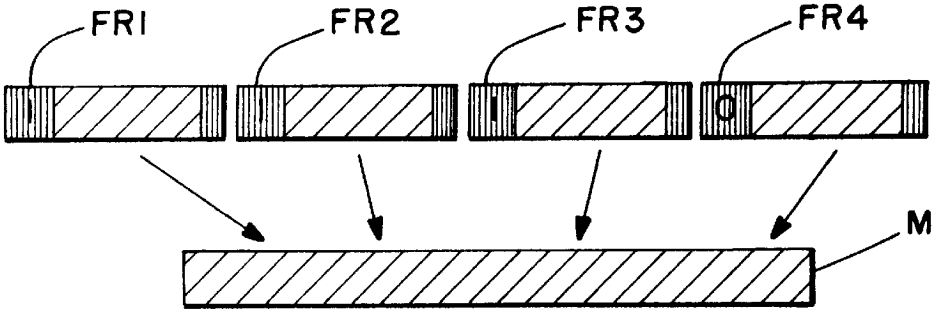


FIG. 5.

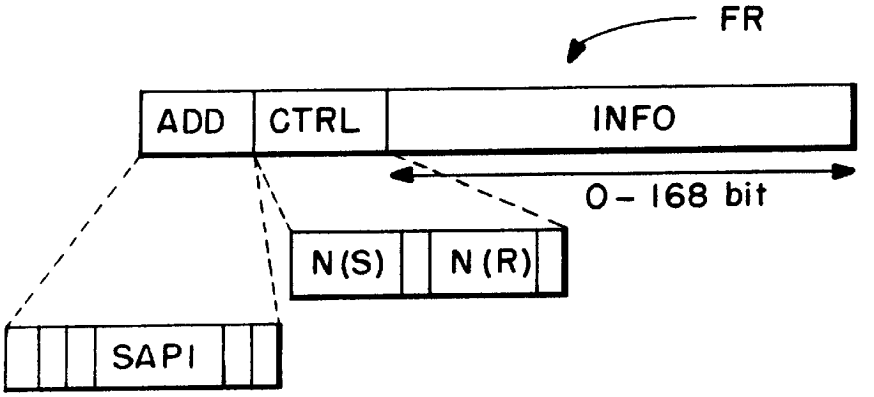


FIG. 6.

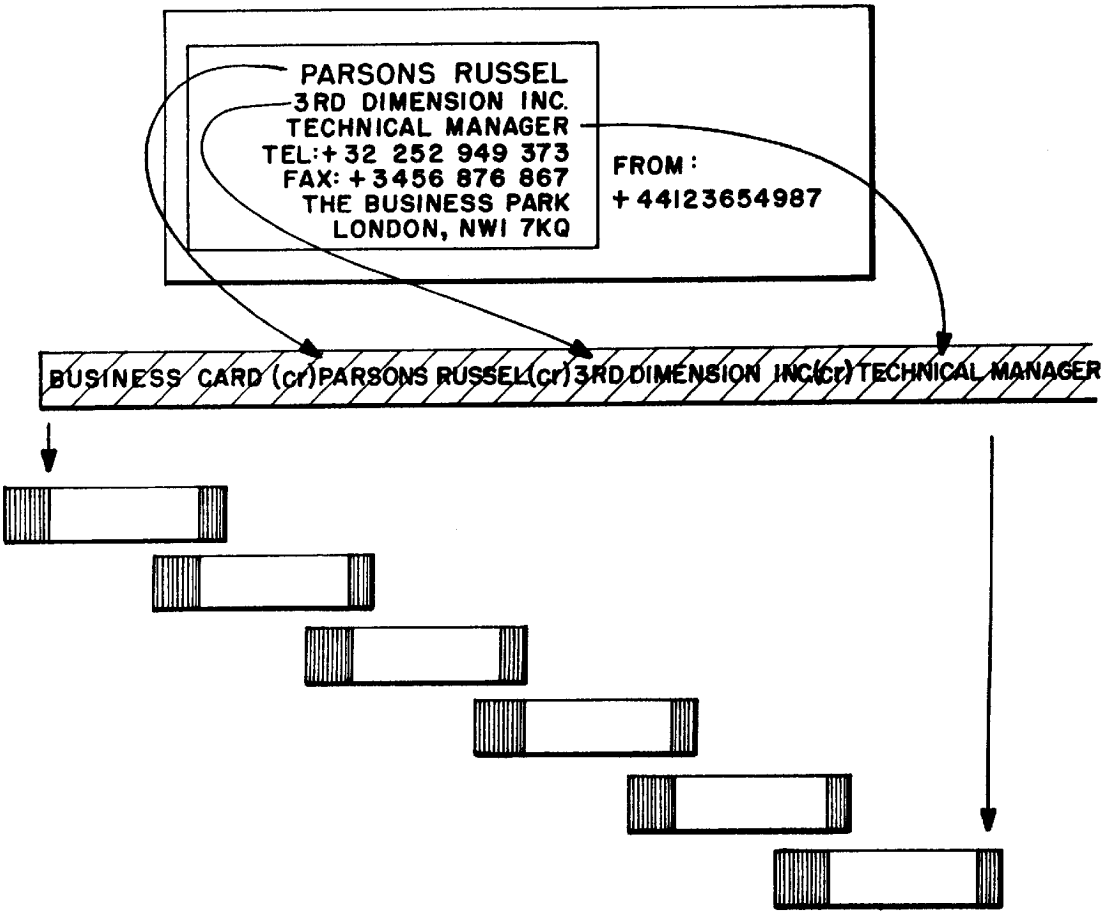


FIG. 7.

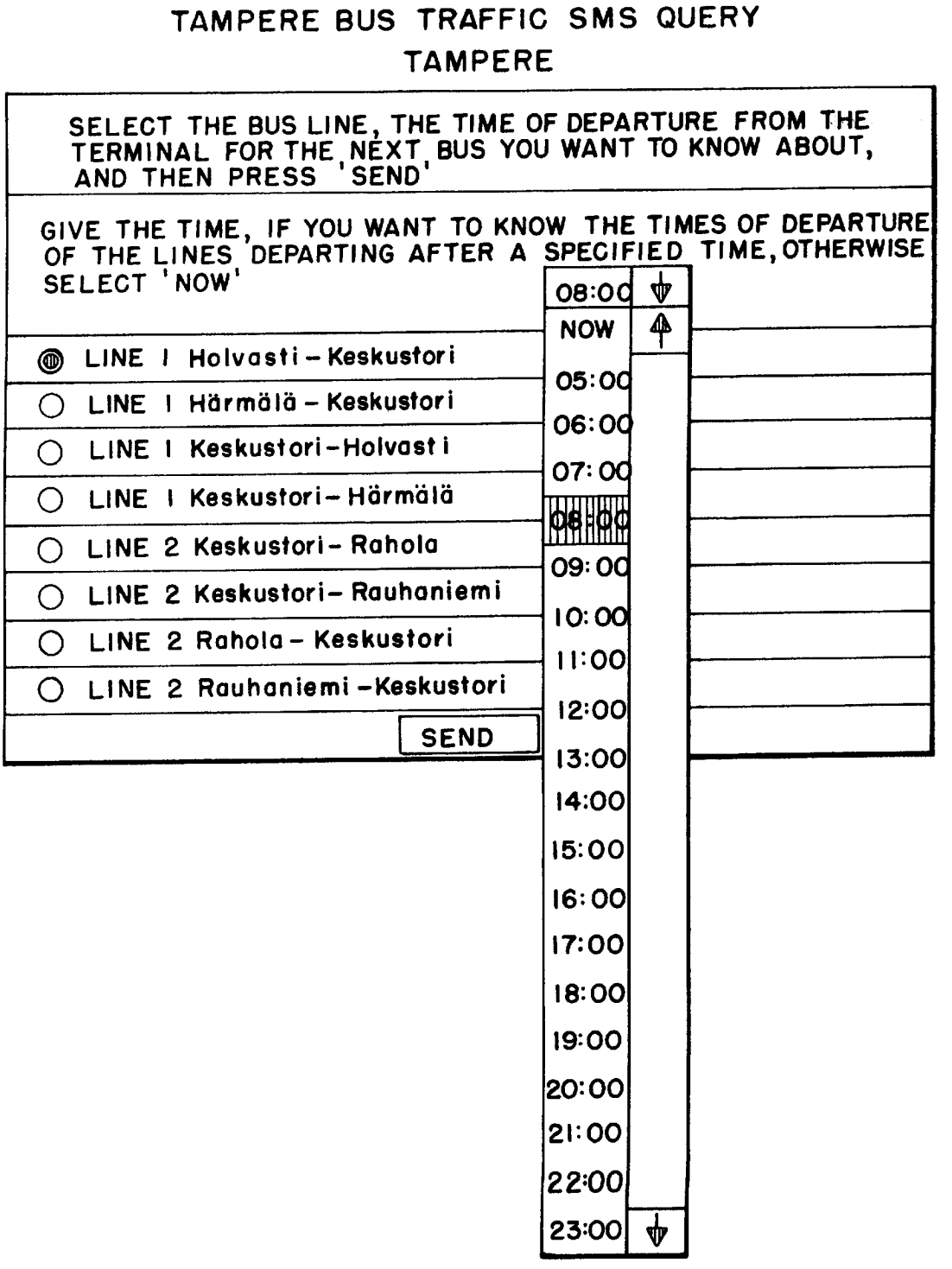
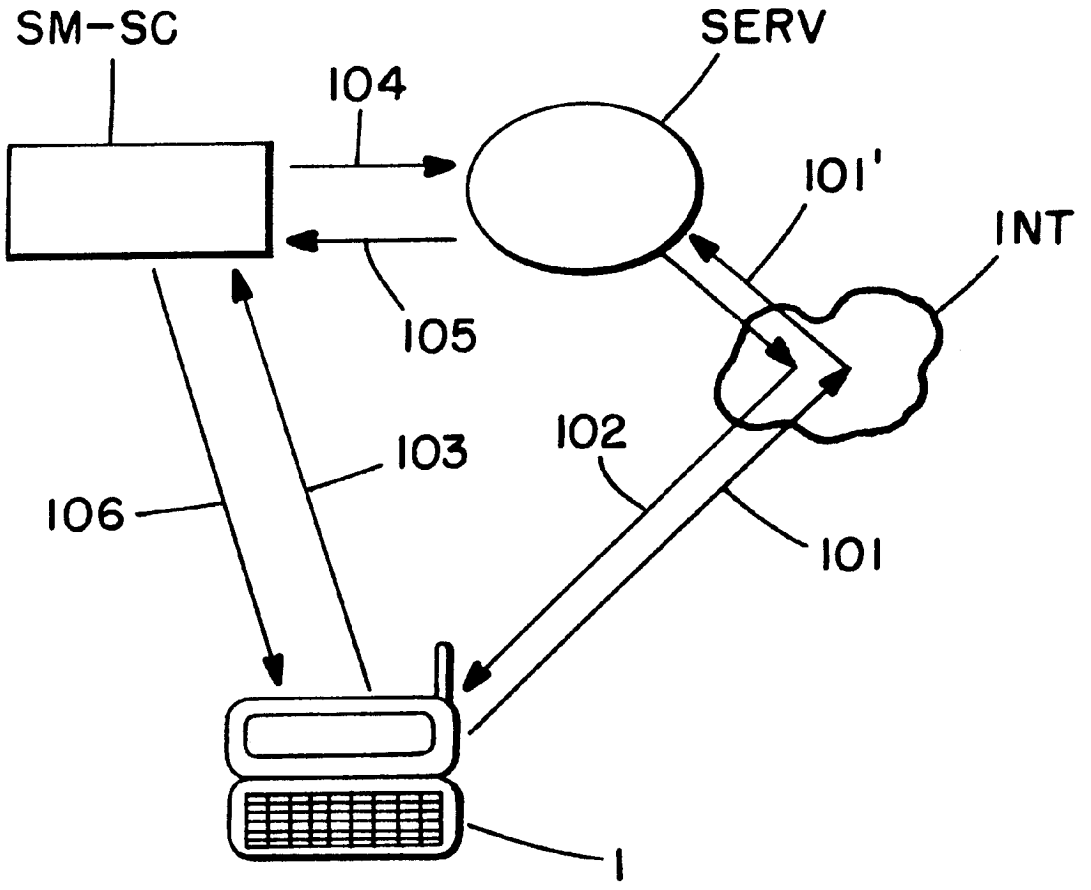


FIG. 8.



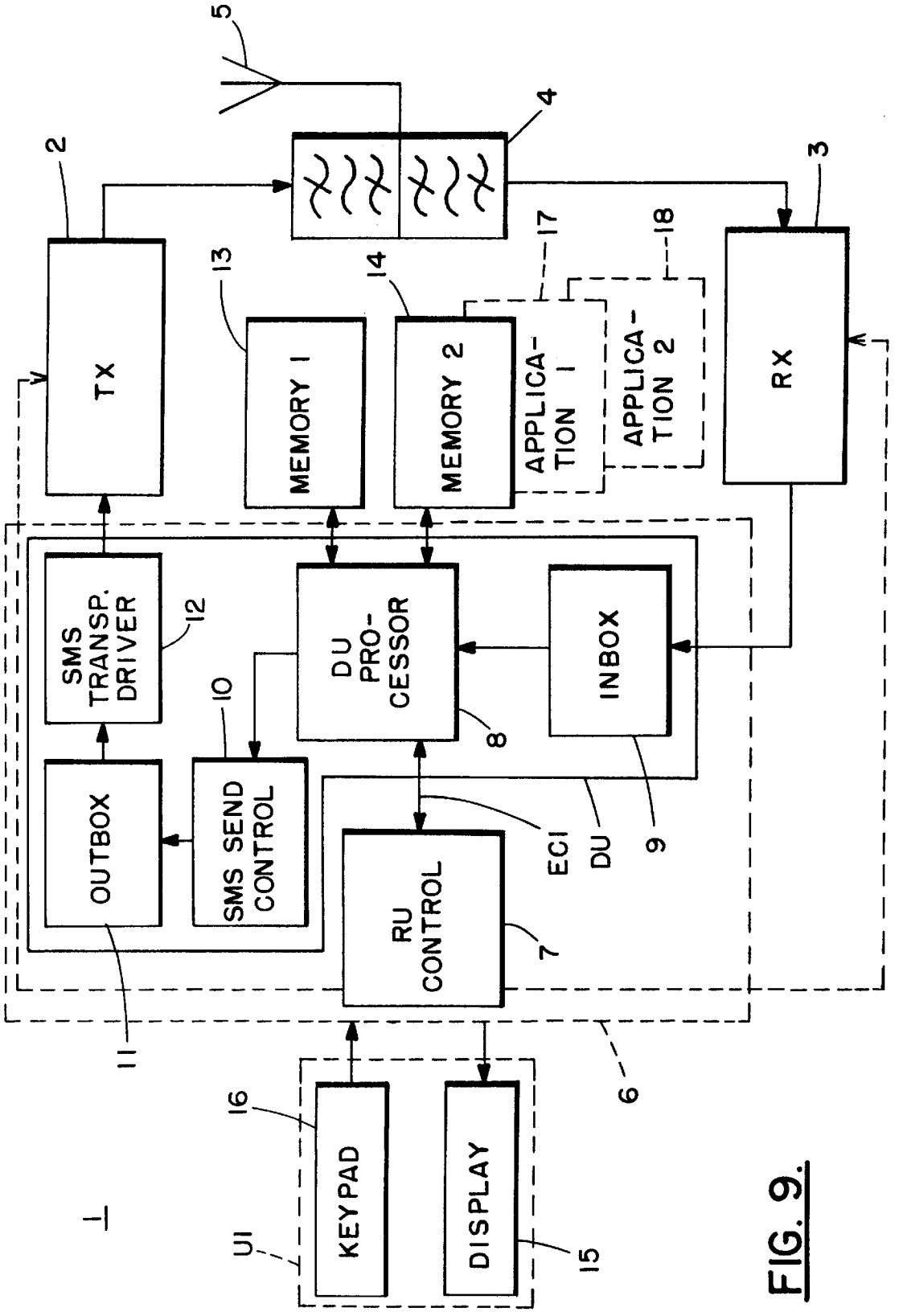


FIG. 9.

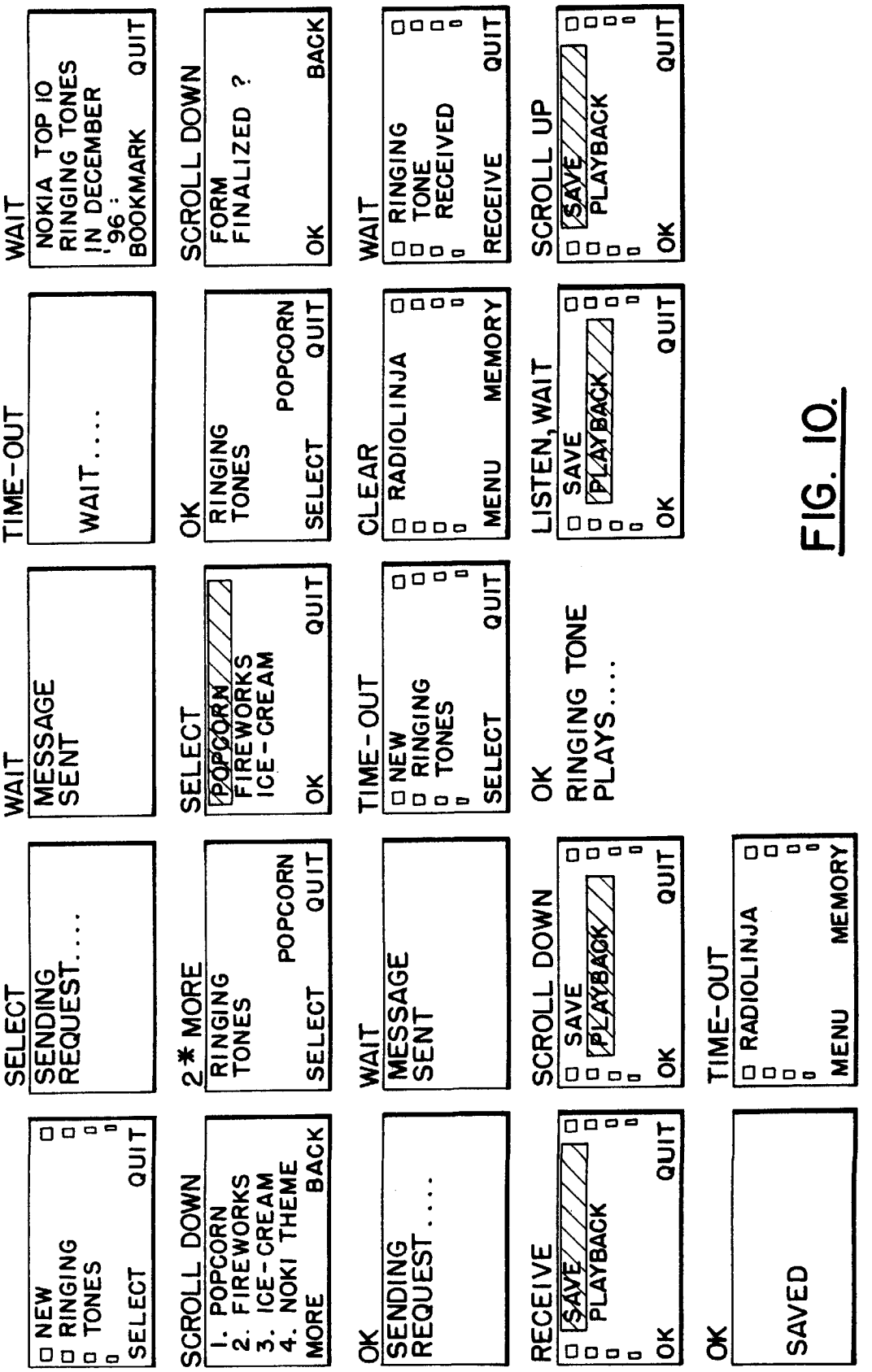


FIG. 10.

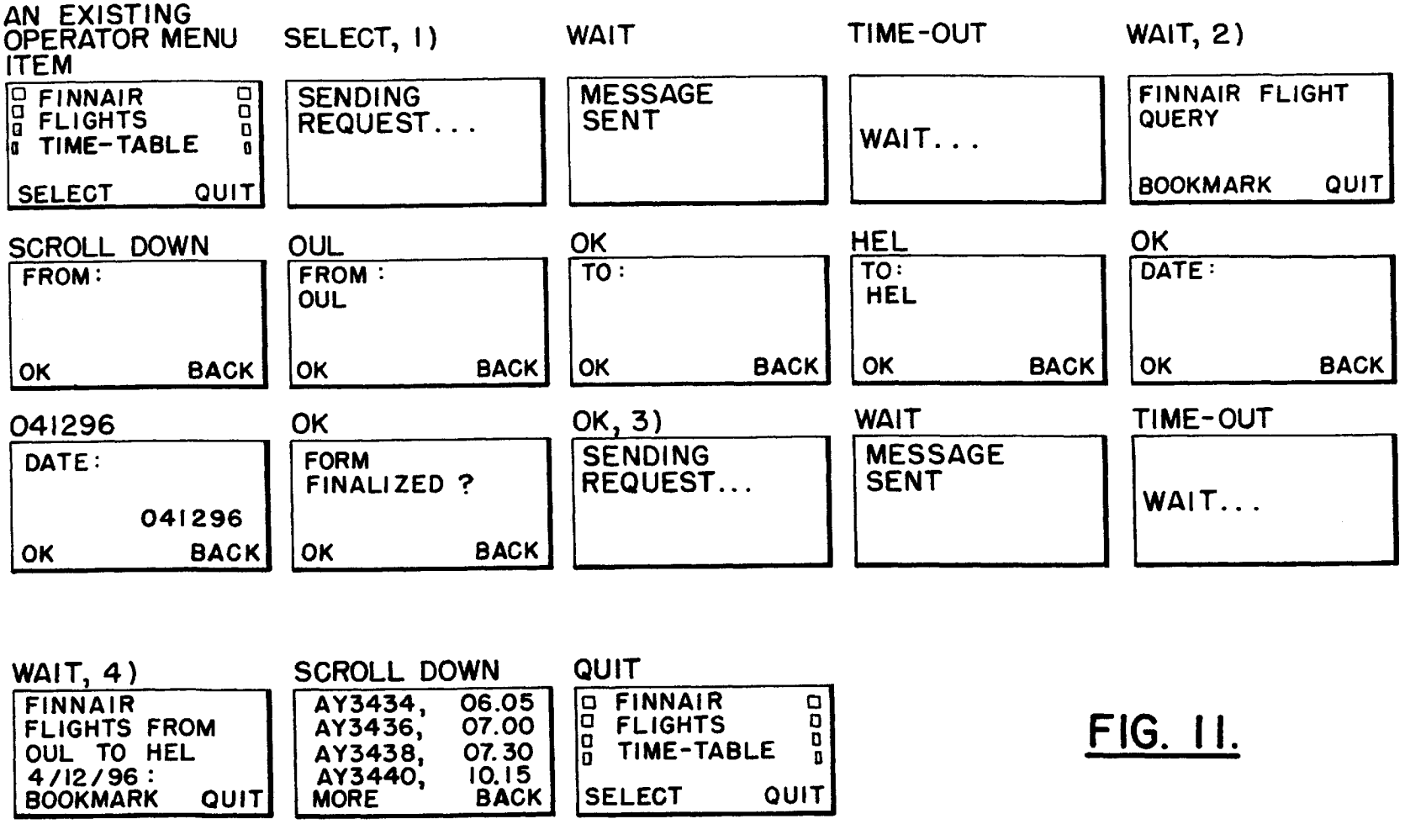


FIG. 11.

COMMUNICATION NETWORK TERMINAL SUPPORTING A PLURALITY OF APPLICATIONS

The present invention relates to a communicator comprising means for displaying and processing an information card containing information, and means for sending the information on the information card, using radio communication, when the transmission includes an information card identifier and a destination identifier. The present invention also concerns a method for forming a transmission message from the information on the information card, wherein the information on the information card, the information card identifier, and the destination identifier are placed in the transmission message.

In digital mobile communications systems, as in the GSM system, it is possible to send so-called short messages. In the GSM system, this is known as the SMS (Short Message Service). Thus, in addition to telephone calls and data transfer, the GSM system also provides, in the form of a short message service, a paging system-like service. However, the short message service known from the GSM system is considerably more advanced than an ordinary paging system. By means of a mobile station, text messages can be both received from and transmitted to a second mobile station. One of the advantages of the short message service of the GSM system is also that the short message can be sent or received at the same time as an ordinary circuit-coupled communication is open, e.g., during a call. Thus, the sending of a short message does not keep the mobile station engaged in case of a possible incoming call.

The advantage of short messages as compared to telephone calls is that they can be sent to a receiver although the receiver cannot be contacted at the time the message is being transmitted. This has been implemented by dividing the transmission of the short message, from a first mobile station to a second mobile station, into two parts as illustrated in FIG. **1**: from a transmitting mobile station **MS1** to a SM-SC (Short Message Service Centre), wherein the short message is stored and sent further to the actual destination, i.e., to a receiving mobile station **MS2**, as soon as contacted. In FIG. **2**, the connection of the short message service centre SM-SC to a mobile station system has been illustrated in more detail. Below, the transmission and flow of short messages between different interfaces, known for prior art, will be discussed by referring to FIGS. **1**–**5**.

The structure of a mobile station system and connections for transmitting short messages are illustrated in FIG. **2**. Mobile stations MS are connected to base stations BTS by means of radio communication. The base stations BTS are further connected, through a so-called Abis interface, to a base station controller BSC, which controls and manages several base stations. The entity formed by a number of base stations BTS (typically, by a few dozen base stations) and a single base station controller BSC, controlling the base stations, is called a base station system BSS. Particularly, the base station controller BSC manages radio communication channels and handovers. On the other hand, the base station controller BSC is connected, through a so-called A interface, to a mobile services switching centre MSC, which co-ordinates the formation of connections both from and to mobile stations. A further connection is made, through the mobile service switching centre MSC, to outside the mobile communications network. The aforementioned short message service centre SM-SC is coupled to the mobile services switching centre MSC.

When a user wants to send a short message by means of the mobile station **MS1** (FIG. **1**), he/she writes a message to be transmitted (using a user interface of the mobile station) and gives the phone number of the mobile station **MS2**, i.e., an identifier of the mobile station **MS2**, whereto the message is going to be transmitted. In addition, the mobile station should have the contact information, i.e., the phone number of the short message service centre SM-SC. Normally, this has been stored in the memory of the mobile station, in which case it is not necessary to separately input the phone number in connection with the sending of each short message. Thus, when sending a short message, the message goes from the mobile station MS to the base station BTS, and from there, through the base station controller BSC and the mobile services switching centre MSC, further to the short message service centre SM-SC. The short message is stored at the short message service centre SM-SC, wherefrom it will be sent further to the receiving mobile station **MS2**, in which case the route of the message is the same as in transmission, but in the opposite direction. The short message service centre SM-SC will be informed whether or not the mobile station **MS2** has received the short message. Thus, it can re-send the short message, if the mobile station **MS2** has not received it for some reason.

By means of the short message service SMS of the GSM system, it is possible to send, at a time, a message the maximum length of which is 160 characters. The characters are seven-bit ASCII (American National Standard Code for Information Interchange) characters and, therefore, the maximum length of a message in bits is 1,120 bits, i.e., 140 bytes. Ordinary mobile stations, as the one illustrated in FIG. **3**, have a small display and an advanced keyboard by means of which it is possible to write short messages, i.e., input different types of alpha-numeric characters. The received message is displayed on the display of the mobile station, which enables the display of alpha-numeric characters, as illustrated in FIG. **3**.

As is well known, transmissions in the GSM system have been divided into frames. When the length of a message to be transmitted exceeds the permissible maximum length of a frame FR, the message M must be segmented into parts **M1**–**M4**, and sent in several frames **FR1**–**FR4**, as illustrated in FIG. **4***a*. In reception, the mobile station reconstructs the message M, divided into several frames **FR1**–**FR4**, as illustrated in FIG. **4***b*. At a radio interface (FIG. **2**), the maximum length of a frame is normally 168 or 184 bits and, therefore, a short message, the maximum length of which is 1,120 bits, must be segmented into several frames. FIG. **5** illustrates a frame, a so-called LAPDm frame (Link Access Protocol for the Dm channel), to be transmitted at a radio interface, which has normally been divided into three fields. The first field is an address field ADD, which contains the address of the destination of the message (i.e., a receiving mobile station identifier), given in several bytes. In the GSM system, signalling messages are also transmitted within corresponding LAPDm frames. In radio communication, there can simultaneously be two message flows independent of each other: signalling messages and short messages. These two different flows are separated from each other by means of a service access point identifier SAPI to be added to the address field ADD. Its value can be 3, indicating signalling, or 0, indicating a short message. The second field is a control field CTRL, which contains the sending frame and receiving frame numbers N(S) and N(F). The third field is a data field INFO, containing the actual information, which contains a maximum of 168 bits of information, i.e., the contents of the actual short message.

As illustrated in FIG. **3**, the user interface of present mobile stations is rather limited, because it has mainly been

designed for calls. At present, communicators are being developed which, in addition to ordinary mobile station functions, also have data processing facilities, which enable, e.g., the maintenance of a notebook, and the sending of a fax message and electronic mail. This type of communicator has been presented in Patent Publication U.S. Pat. No. 5,422,656, comprising a user interface having a traditional alphanumeric keyboard-like keyboard with which it is easier to type, e.g., text messages. In the publication in question, the keyboard has been implemented by means of a touch display.

Publication WO 94/23394 presents an electronic greeting card communication system, comprising an electronic mail server for a communicator having different types of greeting cards, which can be browsed and sent to a similar communicator, for example, by using radio communication. A drawback of the system is that the greeting cards in question can only be sent to a similar communicator. Therefore, the sender should know whether or not the receiver has a communicator supporting the greeting card communication system. In addition, for the implementation of the system, an off-line electronic mail server, for storing different types of greeting cards, should be separately connected to the network for the service in question. Another drawback is that, because the system uses ordinary radio communication to transmit greeting cards, the telephone line of the communicator is engaged during transmission. By means of the communicator, presented in the publication, graphic images including hand written text can be transmitted. The transmission of such an image or a mere hand written message is quite slow due to the large amount of information.

The present invention comprises a communicator and a method therefor for sending information cards, wherein the information on the information card is processed into characters, and transmitted in a short message. This type of message contains a small amount of information and is, therefore, quick to transmit. In addition, the advantages of a short message service can be utilised. Information cards can either be pre-stored in a communicator memory (permanent memory) or a user may store the information cards in a communicator memory (cache memory) by contacting a server by means of a communicator. In both cases, the user may enter user input or modify the information on the information cards. The information ready printed on the information card can also be transmitted. An information card type identifier is preferably added to the transmission, so that a receiving communicator identifies the short message as not an ordinary short message, but a short message containing information from a specific information card. The identifier can be a code in an address or a control field of the short message, or it can be a character code in the message part of the short message. Because it has been realised that the short message service, already existing in the mobile station system, can be utilised for sending information on information cards, the advantages are, e.g., that there is no need to establish an off-line server for sending the information cards, such as, for example, in the system presented in Publication WO 94/23394, and since a short message can be sent simultaneously with a circuit-coupled connection, the sending of the information cards does not engage the communicator's communication line, e.g., in case of a simultaneously incoming call.

The transmission of each information card has been identified by means of a specific character code, i.e., an identifier, which enables the receiving communicator to process the received message directly into an information card, as specified, containing the received data. The identifier has preferably been implemented by using ASCII characters in an information field of the short message transmission frame, i.e., in a field INFO (FIG. **5**), which contains the actual short message in characters. Because the information on the information cards is transmitted in a short message, it can also be received by means of an ordinary mobile station, which does not support the information card system, but is capable of transmitting and receiving short messages. By placing the information card identifier in the field INFO, there is also the advantage that in an ordinary mobile station, which does not support this type of information card service, but is capable of transmitting and receiving short messages, the information card identifier is displayed to a user of the communicator and, hence, the user notices not having received an ordinary short message, but the information on a specific information card. In addition, a user of this type of ordinary mobile station can also transmit a message, such as mentioned above, by first writing, on the message, the identifier of the information card in question in characters, and the rest of the information correctly divided. The reception of such a transmission by means of a communicator, according to the present invention, will produce a fully received information card.

Alternatively, the information card identifier is formed as a specific bit code in the address or information field of the short message (see FIG. **5**). Furthermore, in this case, an ordinary mobile station can receive the information on the transmitted information card, but the user cannot see, in connection with the message, that the received message is the information on a specific information card. In this case, the information on this type of information card cannot be sent by means of an ordinary mobile station, unless it is modified, so that by entering a specific command, it will add the aforementioned bit code because, otherwise, the ordinary mobile station is unable to inform of the information card identifier.

A communicator according to the present invention is characterised in that it comprises the means for processing information into characters and for transmitting the information in characters in a short message. Correspondingly, a method according to the present invention is characterised in that information on an information card is processed into characters and, of said characters, a short message, to be transmitted using radio communication, is formed.

The invention will be discussed below in detail by referring to the enclosed drawings and appendices, in which

FIG. **1** illustrates the flow of a short message from one mobile station to another,

FIG. **2** illustrates connections of a mobile station system to a short message service centre,

FIG. **3** illustrates a user interface of an ordinary mobile communicator,

FIG. **4***a* illustrates segmenting of a message into frames in transmission,

FIG. **4***b* illustrates reconstruction of a message in reception,

FIG. **5** illustrates a frame of a short message,

FIG. **6** illustrates one information card according to the present invention,

FIG. **7** illustrates another information card,

FIG. **8** illustrates the transmission of the information card, illustrated in FIG. **7**, from the system's viewpoint,

FIG. **9** illustrates the implementation of the communicator according to the present invention, and

FIG. **10** and FIG. **11** illustrates the information card, illustrated in FIG. **7**, presented in characters.

FIGS. **1–5** were discussed above in connection with prior art. In the following, the present invention will be discussed by referring to FIGS. **6–11**.

FIG. **6** illustrates an example of an information card, pre-stored in a communicator, the user input information on which can be sent to another communicator as a short message. This card type is a so-called "Business Card". The card contains the following information: name, position, company, contact information, etc. Each information can be in its own field or the information card may only have one field, whereinto all the information is fed. FIG. **6** also illustrates the transmission of the information on an information card as a short message. In this case, an identifier of the information card type may be, e.g., 'BC' or 'Business Card' as illustrated in the figure. A communicator, according to the present invention, adds the information card identifier in characters to the beginning of the information field of the short message to be transmitted first. The contents of the different fields ends automatically in a line feed character. On the basis of this character, a receiving communicator is capable of dividing the received information into the corresponding fields on the information card. If this type of message was transmitted as a short message from an ordinary mobile station, a user would write, at the beginning of the message, an information card identifier, i.e., in the case of FIG. **6**, 'Business Card', after that a line feed character [cr], then the information on the information card in succession or by field (depending on the information card specification), i.e., first the information in the name field and a line feed character, etc. A received 'Business Card' can be stored in a memory of the communicator, where business cards can thus be stored in an electronic form.

In the following, we will discuss, as an example, other types of information cards, pre-stored in a communicator, which can be implemented in a communicator according to the present invention.

An information card "Call Me Back" may contain a person's name, telephone number, address, etc., as well as a message that the person should call back. This information can be divided into separate fields or be in the same field, as presented above. The aforementioned message to call back may be inseparably linked to the "Call Me Back" card and/or "Call Me Back" (as text) can be written as an identifier, which will also be displayed on the display of an ordinary mobile station, in which case, a user of the mobile station in question receiving the message will see that it is a request to call back. The transmission of the "Call Me Back" card can be connected to an outgoing call, so that if the receiving communicator does not respond, the transmitting communicator will ask whether a "Call Me Back" card should be sent, in which case, if the response is positive, it will output the card in question on the display with the telephone number of the sender (which it can access, e.g., from one's own SIM card, Subscriber Identity Module) ready input on the card. The user may input the rest of the information and modify it on the display. When a card is sent as a short message, the communicator automatically offers the telephone number of the receiver as the destination of the message, which it can pick up from the information of the call left unanswered.

An identifier of an information card 'Meeting Proposal' can be 'Meeting Proposal', and the information on the card may contain a convener's name, time and place of the meeting, as well as its subject. If, in a communicator, there is also an electronic notebook, the transmission of the information card in question can be connected to the functioning of the notebook so that, as a response to the transmission of this type of card, a reservation for the meeting at the time in question is made in the notebook. An application of the information card preferably picks up the time of the meeting from the information card and enters, in the notebook, at the time in question, the rest of the information on the information card, such as the place and subject of the meeting, as well as the name of the convener. Correspondingly, when receiving this type of information card, the communicator automatically searches, in the notebook, for a statement of what may already have been agreed upon at the time in question (if entered in the notebook). Thus, the receiver can quickly decide whether to answer 'Yes' or 'No' to the meeting proposal. When such an answer is sent, the communicator establishes an information card 'Meeting Proposal Answer', whose identifier can be, e.g., 'Meeting Proposal Answer', and the information on the card may contain a receiver's name, a time and place of the meeting, subject, answer (Yes/No), and comments. In this case, the notebook in the communicator of the receiver, i.e., the sender of the meeting proposal, is preferably arranged, so that it either confirms or cancels the reservation made in the notebook.

Furthermore, as a continuation for the aforementioned information card, there may be, in the communicator, an information card 'Meeting Confirmation', whose identifier is, e.g., 'Meeting Confirmation', and the information on the card may contain a convener's name, a time and place of the meeting, and its subject. The communicator preferably offers to send this information card automatically to all those who answered 'Yes' to the meeting proposal. In this case, the mobile stations or telecommunicators receiving the card will confirm the reservation in question in the notebook.

Correspondingly, in the same way as with the 'Meeting Proposal' card, other types of time reservation cards can be arranged in the communicator, e.g., an information card 'Free Time Query', whose identifier can be, e.g., 'Free Time Query', and the information on the card may contain a sender's name, a time, a place, and a subject, which a user may freely fill in, e.g., tennis, dinner, etc.

The communicator preferably functions in this connection in the corresponding way, both in transmission and reception, as in connection with the meeting proposal information cards, i.e., it makes a reservation in the notebook, enables the response to a query by means of another card, and, furthermore, enters in the notebook a possible confirmation or cancellation.

By means of an information card 'Service DTMF Commands', information can be received, e.g., from a network operator in order to utilise services provided by the operator. A card identifier can be 'Service DTMF Commands', and it may have fields for a sender's name, a DTMF command, and an explanation field. The command can be, e.g., a password, a user identifier, or something else related to the services provided by the operator. A user may use the received command, e.g., a password, when utilising the offered services, in which case, the user does not have to input the password through the keyboard, because the password can be obtained directly from the card in question.

In the following, an information card, which has not been pre-stored in a communicator, will be discussed by referring to FIGS. **7–9**, and to Appendix **1**. By means of the communicator, electronic mail can be sent through a mobile communications network. Correspondingly, by means of the communicator, a communications link can be established to the Internet through a mobile communications network. This communications link can be established by connecting a computer to a mobile station, by means of a data card, in

which case a user interface of the computer can be utilised for reading pages and services on the Internet. Alternatively, a communications link to the Internet can be established by means of a so-called communicator, which comprises in itself a user interface for reading pages and services on the Internet. A communicator of this type has been presented in another Finnish patent application titled "A terminal to be coupled to a telecommunications network using radio communication", submitted at the same time. Computer programs by means of which a communications link to different pages on the Internet can be established, and which enable the so-called surfing on the Internet, are called WWW (World Wide Web) browsers. Currently, a number of different companies have their own service pages on the Internet, through which a user may order information on a service or make orders and reservations. This is accomplished by establishing communication to such a service page and by inputting information on what is required from the provider of services. This information can be either text or selection boxes/keys, by means of which selections are made according to the 'tick the appropriate box' principle. An example of such a service page has been given in FIG. **7***a,* which illustrates a query page for bus schedules, which a user can download onto the display, e.g., through a telecommunications network, such as the Internet. In this case, the page will be stored in the communicator's memory (e.g., hidden memory) for the duration of the use of the page, and it can be stored in the permanent memory by means of an off-line command. On the page, selections can be made in boxes and additional requests and, for example, contact information for feedback, can be written in the space that may be available on the page. Alternatively, the communicator may automatically offer its own telephone number as the address for the feedback, as presented above in connection with the "Call Me Back" information card. As is known, a page on the Internet can be presented in the HTML language (Hyper Text Markup Language) to transform the page into HTML characters. Transforming and presenting a service page from the Internet in the HTML language is known from WWW browsers.

Appendix **1** illustrates the Internet page in FIG. **7** transformed into the HTML language in order to present the page in characters. The characters can be sent in a short message. In the GSM system, a message, whose maximum length is 160 characters, can be sent in a short message. Therefore, in the present invention, a whole page is not preferably transmitted, but only certain information of it. In the HTML code on this service page, both the information to be displayed on the display and the hidden information have been specified. Different types of data have pre-set codes. To send the page according to the present invention, information necessary for the sending of an information card is added to the HTML code of the page, and this information is hidden from a user, i.e., it will not be included in the graphic presentation of the page. The information has preferably been arranged on the page by the provider of services. Thus, in order to be able to send such a service page as a short message, the provider of services should support the opportunity in question by including in the page in question specific information, at least the telephone number to which a message should be sent. At arrows A–J, illustrated in Appendix **1**, there has been given information, which is added to the HTML code in order to send the information on the page in a short message according to the present invention. For example, at the arrow A, a coding method can be indicated by means of a presented specification. The arrow B indicates that the type of the form is a query; the arrow C gives the name or abbreviation of the provider of services; the arrow D indicates the type of service in question; the arrow E gives the name of the service page; the arrow F indicates which form the communicator should use to display the answer; the arrow G gives the telephone number of the receiver, i.e., the provider of services; the arrow H gives the telephone number of a short message service centre through which the message is transmitted. The information indicated by the arrows G and H is essential, at the least. The arrows I and J indicate other specifications, which can be added on the HTML page as necessary. After the arrow J comes the actual HTML code that forms the WWW page in question.

Correspondingly, a communicator can be pre-set to find specific identifiers in the HTML code, which it picks up from the HTML code and attaches as characters to the data field INFO of the message to be sent (see FIG. **5**). For example, a selected time is found on a line indicated by an arrow K as a variable clo, after which the selected time is presented, which will be obtained as a response to a press of the SEND button. As illustrated in FIG. **7**, an uppermost selection box "1B1" has been marked, which is shown in the HTML code on a line indicated by an arrow L as a code checked. When a user presses the SEND button, a variable opt**1** will get the value of the selection box, which has been selected when pressing the icon, i.e., the value "1B1", assuming that the uppermost selection box has been selected.

In the example, illustrated in FIG. **7** and Appendix **1**, a communicator may, in this way, pick up information from the HTML code on lines indicated by the arrows C, D, G, H, K, and L. The communicator will place, at the beginning, an identifier indicating the information card type, here as an identifier "WWWSMS". In addition, from the point indicated by the arrow C, a service provider identifier, on the basis of which the receiver will recognise the information in question, e.g., here a character C, can be placed in front. Furthermore, the service name can be placed correspondingly from the point of the arrow D, the telephone number of the sender from the point of the arrow G, the telephone number of the receiver from the point of the arrow D, and the selections made by the user from the points of the arrows K and L, which functions, so that the values of all the variables (here variables clo and opt**1**) on the page are placed on the message. The values of the variables are preferably obtained as a response to a send command, i.e., to a press of the SEND icon. In this case, the data sent in the short message are, e.g., as follows:

WWWSM[cr]
CErSa[f]
DTreBus[f]
G+358505337397[f]
H+358508771010[f]
08:00 1B1

in which the [cr] character indicates a line feed and the [f] character is a field separator, which indicates the ending of the field and, on the last line, all the selections made by the user are shown, i.e., that the user requests information on the timetable of the buses of the line 1B1 (Holvasti-Keskustori) departing after 08:00 o'clock. On the basis of this, the provider of services is able to send to the user information on the timetable of the bus line in question.

When this type of service page has been downloaded from the Internet, it can then be stored in the memory of the communicator, and later re-used without establishing a communications link to the Internet. Correspondingly, as to

information cards pre-stored in the communicator, a specific identifier can be attached to the message, in connection with the sending of the information on the information card illustrated in FIG. **7** and Appendix **1**, which indicates that the information card is a service page downloaded from the Internet, e.g., the identifier 'WWWSMS' as in the example discussed above or 'WWWSMS45', in which the beginning indicates that it is a service page and the last two characters may indicate, e.g., the provider of services.

Sending information on a service page in a short message according to the present invention saves considerably the power consumption of the communicator and, thus, prolongs its useful life, which is an important objective in battery-operated devices. In addition, savings are made in phone call expenses, when query information can be sent together with the short message. The whole system has been illustrated in more detail in FIG. **8**. A communicator according to the present invention has been presented with Reference **1**, by means of which a communications link (reference **101**) to the Internet INT can be established. The invention could also be implemented by means of a device having means, according to the present invention, for processing information on an information card into a short message, which is sent through an ordinary mobile station by coupling the device to the mobile station. Such a device could be, e.g., a computer. To simplify matters, only a communicator will be discussed here. When the communications link is established to the Internet by means of a communicator **1**, a service page of a provider of services can be downloaded (reference **102**) from the Internet into its memory and user interface. By means of solutions known for prior art, the user, after having filled in the page, has sent the service page by means of the communicator **1** to a server SERV of the provider of services, i.e., along route **101**–**101**'. This means that the communications link to the Internet should be open for transmission. In a system according to the present invention, the information on the service page is sent (reference **103**) in a short message to a short message service centre SM-SC, which sends it further (reference **104**) to the server SERV of the provider of services. The transmission of the service page through the Internet, according to prior art, lasts considerably longer than the transmission of a short message and, thus, due to the present invention, a shorter transmission time is achieved, thereby, effecting a saving in power, since, in the communicator, transmission and reception, in particular, consume a lot of power compared to other functions. In addition, in the solution according to prior art, a circuit-coupled connection is in use in transmission, in which case the communicator is engaged during transmission. On the other hand, the sending of a short message does not engage the circuit-coupled connection, and an additional advantage is that the short message service centre will send the message to a receiver later, if the telephone number of the provider of services happens to be engaged during the transmission of the message.

When the user has in this way sent the provider of services a query, the provider of services will interpret it and respond to it. The provider of services may also send the response (reference **105**–**106**) as a short message, and it can, in the same way as in the transmission of the service page, contain HTML codes, which the communicator will interpret and transform into a form legible to the user. Thus, the sending of a response has the same advantages as the sending of an query. For the response, the original information card, i.e., the service page downloaded from the Internet, can be arranged, so that it has space (fields) ready for the response. When the user sends the query to the provider of services, he/she stores the page in the communicator. The response will have, in the same way as in transmission, specific identifiers, in which case, as the response arrives, the communicator will open, on the display, the page in question and place the response in the area provided for it, whereupon the situation from the user's viewpoint looks as if he/she has received a WWW page containing the response. The response from the provider of services can also be, e.g., in a form of an information card 'DTMF Service Commands' or in a corresponding form.

Instead of an information card identifier being indicated as a character code in a short message (in data field INFO), it can be indicated in an address field ADD of the short message, in which case it is given in bits. A certain byte in the address field of the transmission frame of the short message is a so-called TP-Data-Coding-Scheme, which has been specified in the GSM specification as GSM 03.40 and 03.38. The four less significant bits of the byte can be freely used, whereupon they can be used to indicate the type of the information card to be sent according to the present invention. Different types of information cards can be indicated by means of these four bits according to the example given in the following table, wherein bits are marked with references b**3**–b**0**, in which b**0** is the less significant bit of the aforementioned byte:

b_3	b_2	b_1	b_0	type
0	0	0	0	Business Card
0	0	0	1	Call Me Back
0	0	1	0	Meeting Proposal
0	0	1	1	Meeting Proposal Answer
0	1	0	0	Meeting Confirmation
0	1	0	1	Free-TimeQuery1
0	1	1	0	Free-TimeQuery2
0	1	1	1	Free-TimeQuery3
1	0	0	0	DTMF ServiceCommands
1	0	0	1	WWWSMS00
1	0	1	0	WWWSMS01
1	0	1	1	WWWSMS02
1	1	0	0	WWWSMS03
1	1	0	1	WWWSMS04
1	1	1	0	WWWSMS05
1	1	1	1	WWWSMS06

Identifying the information card in this way does not take the space reserved for the character length (max. 160 characters) of the message. When this type of identification is used, it is also possible to receive the information on the information card sent by means of an ordinary mobile station, but in this case, the user is unable to see, in connection with the message, that it is the information from a specific information card, unless this information is programmed in the mobile station. Neither can the information on this type of information card be sent by means of an ordinary mobile station, because the user is unable to add this type of identifier to the message.

In the following, the implementation of a communicator according to the present invention, and its operation in transmitting and receiving an information card will be discussed in more detail by referring to FIG. **9**.

In FIG. **9**, there is a block diagram of the implementation of a communicator according to the present invention. The communicator is preferably a communicator, which has circuits and a user interface that enable the processing of information cards. A communicator **1** comprises, for communication using radio communication, a radio unit RU (the reference has not been marked in the figure), which com-

prises a transmitter branch **2**, known from an ordinary mobile station, (comprising blocks implementing coding, interleaving, ciphering, modulating, and transmitting), a receiving branch **3** (comprising receiving, de-modulating, de-ciphering, de-interleaving, and implementing blocks) and, for transmission using radio communication, a duplex filter **4** that distinguishes between a received and transmitted message, as well as an antenna **5**. The communicator has a main control circuit **6** that controls its operation. Furthermore, the main control circuit **6** comprises still a RU controller **7** that carries out control functions of an ordinary mobile station. In addition, the communicator main control circuit **6** comprises blocks **8–12** for carrying out the functions of a data processing unit of the communicator and for sending information cards as a short message according to the present invention. Thus, the blocks **8–12** can be said to form a data processing unit DU of the communicator. The controls of the radio unit RU and the communicator's data processing unit DU do not have to be integrated into the main control circuit but, instead, they could also be implemented apart from each other, so that the RU control circuit **7** is on the radio unit's side, and on the data processing unit's side, there is the DU processor **8**, which is in connection with the RU control circuit **7** for establishing communication between the radio unit and the data processing unit.

In the implementation illustrated in FIG. **9**, a first memory **13** is coupled to the main control circuit **6**. The first memory can be a volatile memory, e.g., RAM, where the main control circuit stores in-use data. In addition, the communicator has a second memory **14**, which is preferably a permanent memory **14**, wherein the communicator's application programs performing different kinds of services, different types of information cards, other data essential for the functioning of the communicator, and any other data which a user wants to store permanently, are stored. Alternatively, the information cards can be stored off-line in a memory of an intelligent card, coupled to the communicator, wherefrom there is a connection to the main control circuit **6**. This type of intelligent card is known, e.g., from the GSM mobile communications system, as a SIM card (Subscriber Identity Module), which usually has storage, e.g., for storing telephone numbers. In this case, new information cards can be updated in the communicator by simply updating the memory of the intelligent card.

For viewing information cards, the communicator has a display **15**, and for inputting data, a keyboard or other input device **16**, such as a touch display.

In the case where the data processing unit DU and the radio unit RU are implemented as functionally independent units, both of them should, however, have either common or separate memories **13**, **14**, and a user interface UI. Communication between the units would be established by means of a connection between the DU processor **8** and the RU control circuit **7** which, in this connection, is referred to as an external control interface ECI.

In the following, we will discus the implementation and operation of the communicator, when transmitting information cards. By means of the user interface UI, the required information card is brought onto the communicator's display, in which case, on the basis of 16 commands from input devices, the control circuit **7** retrieves from the memory **14**, wherein applications **18** programmably implementing the information cards have been stored, one of the information cards stored therein onto the display **15** or retrieves an information card from the telecommunications network as presented above. The application of an information card is processed in the DU processor **8**, which also controls the transmission of information cards by maintaining contact with the RU control circuit **7**, which controls the operation of the radio unit RU. An information card contains information, as illustrated in FIG. **6**. The information can be in one or more fields, which have either been ready filled in (if a card already containing information was retrieved from the memory) or its data fields are empty, in which case a user may input information in the fields by means of the input devices **16** or modify the information in the fields. When the information card contains the required information and the user enters, by means of the input devices, a command to send the information card, the DU processor **8** forms, from the information on the information card, a line of characters, so that it places at the beginning of the line the information card identifier (unless the identifier is given in the address field), and after that, e.g., the information contained in the different fields, separated by line feed characters, in alphanumeric characters including the possible space between the characters. Hence, the DU processor **8** comprises, for the processing of the characters, word processing program-like functions, which have been implemented programmably and stored in the memory **14**, wherefrom the DU processor **8** retrieves the program and performs the functions according to the program. The DU processor **8** transfers the line of characters formed to a SMS transmission controller **10**, which adds to the message address information, i.e., the information on the destination either on the basis of the user input information or by retrieving it from another application, e.g., from the notebook **17** as presented above. Thus, this type of SMS transmission controller is a kind of bit and/or character generator. The notebook **17** is preferably implemented as an application program, stored in the memory **14**, which is used by means of the DU processor **8**. Thus, communication between the notebook and information card applications **17** and **18** is established by means of the DU processor, which thereby, e.g., on the basis of time information retrieved from an information card, opens up or enters information in the notebook at the time in question.

When address information has been added at a SMS transmission controller **10**, the message is transferred into an inbox **11**, which tries to send the message, and which has a buffer wherein the message is stored in case the transmission fails. If the transmission fails, the inbox **11** re-tries to send the message. When the DU controller **8** notices that the radio unit RU is ready to send the message, the message is transferred to a message transfer running circuit **12**, which adds to the message information relating to the mobile communications system in question, such as validity information (which indicates to which direction the message is going, i.e., from a mobile station to a message service centre or vice versa), processes the address information into a form required by the mobile communications system, and adds to the message the address of the message service centre, as well as the short message identifier (SAPI), and forms from the information to be transmitted, e.g., a digital signal for a transmitter **2**, and sends the message to the radio transmitter branch **2** of the radio unit RU. In the case where the information card identifier is placed in bits in the address field ADD, the running circuit **12** adds to the message the identifier in question. The transmitter branch **2** codes the signal according to the specifications of the mobile communications system, and forms, on the basis of the signal it receives from the running circuit **12**, the frames to be transmitted, which the transmitter sends using radio communication to the short message service centre SM-SC, wherefrom they are sent further to the receiver (see FIG. **1**). In the transmitter branch **2**, the message is processed accord-

ing to the mobile communications system, e.g., coding, interleaving, ciphering, burst forming, modulating, and transmission.

In the following, we will discus the implementation and operation of the communicator in receiving information cards. When the communicator receives a short message on an information card, the message first arrives at the radio unit RU. There, at a receiving branch **3**, the processing of the message takes place according to the mobile communications system, such as reception, demodulating, de-ciphering, de-interleaving, and decoding. If the received frame identifier (SAPI) indicates that the message is a short message, it will be transferred into a destination box **9** of the data processing unit, which can be a memory for message. If the received message is an ordinary short message, the DU processor **8** will report the short message received. If the message has an identifier, which indicates that it is an information card, the DU processor **8** will launch an application **18** of the information card in question, and place the information, from the received message, on the information card in accordance with the markings on the received message. Hence, the reception of the short message will be displayed to a user as a received information card.

A communicator according to the present invention provides a simple way of transmitting and receiving information cards, so that the reaching of the destination is guaranteed, and with an optimum current consumption.

This paper presents the implementation and embodiments of the invention with the help of examples. It is obvious to a person skilled in the art, that the invention is not restricted to details of the embodiments presented above, and that the invention can be implemented in another embodiment without deviating from the characteristics of the invention. Thus, the presented embodiments should be considered illustrative, but not restricting. Hence, the possibilities of implementing and using the invention are only restricted by the enclosed patent claims. Consequently, the various options of implementing the invention as determined by the claims, including the equivalent implementations, also belong to the scope of the present invention.

APPENDIX 1

```
      <head><title>WWW SMS TRE NEXT BUS</title></head>
      <html><body>
      <form METHOD="SMS"
      ACTION="None"
A→    ENCTYPE="b6"
      >
      <SMS_FORM_INFO
B→    FORM_TYPE="Req"
C→    PROVIDER="ErSa"
D→    SERVICE="TreBus"
E→    FORM_NAME=TBReq"
F→    RESPONSE_FORM="TBRes"
G→    TARGET_NUMBER="+358505337397"
H→    SERVICE_CENTER="+358508771010"
I→    FIELD_NAMES="N"
J→    PROTOCOL-ID="None"
      >
      <h2><p align=center>Tampere bus traffic SMS query</p></h2>
      <h1><p align=center>Tampere</h1></p>
      <table bgcolor=white width=95% cellspacing=2 border=2>
      <tr><td align=center>Select the bus line, the time of departure
      from the terminal for the next bus you want to know about, and
      then press 'SEND'</td></tr>
      <tr><td align=center>Give the time, if you want to know the times
      of departure of the lines departing after a specific time, otherwise,
      select 'Now'
K→    <SELECT NAME="clo">08:00
        <OPTION>Now
        <OPTION>05:00
        <OPTION>06:00
        <OPTION>07:00
        <OPTION>08:00
        <OPTION>09:00
        <OPTION>10:00
        <OPTION>11:00
        <OPTION>12:00
        <OPTION>13:00
        <OPTION>14:00
        <OPTION>15:00
        <OPTION>16:00
        <OPTION>17:00
        <OPTION>18:00
        <OPTION>19:00
        <OPTION>20:00
        <OPTION>21:00
        <OPTION>22:00
        <OPTION>23:00
        <OPTION>24:00
        <OPTION>01:00
      </SELECT><P>
      </td></tr>
L→    <tr><td><input type=radio checked name="opt1"
      value="1B1"><b>Line 1 Holvasti - Keskustori</b></td></tr>
      <tr><td><input type=radio name="opt1" value="1B2"><b>Line 1
      Härmälä - Keskustori<b></td></tr>
      <tr><td><input type=radio name="opt1" value="1B3"><b>Line 1
      Keskustori - Holvasti<b></td></tr>
      <tr><td><input type=radio name="opt1" value="1B4"><b>Line 1
      Keskustori - Härmälä<b></td></tr>
      <tr><td><input type=radio name="opt1" value="2B1"><b>Line 2
      Keskustori - Rahola<b></td></tr>
      <tr><td><input type=radio name="opt1" value="2B2"><b>Line 2
      Keskustori - Rauhaniemi<b></td></tr>
      <tr><td><input type=radio name="opt1" value="2B3"><b>Line 2
      Rahola - Keskustori <b></td></tr>
      <tr><td><input type=radio name="opt1" value="2B4"><b>Line 2
      Rauhaniemi - Keskustori<b></td></tr>
      <tr><td align=center><h2><input type=submit
      value="SEND"></td></tr></h2>
      </table>
      </form>
      </body>
      </html>
```

What is claimed is:

1. A terminal for a communication network, the terminal comprising a plurality of applications for displaying information and processing information and further comprising wireless communication means for communicating user messages, wherein said terminal comprises means for receiving a wireless communicated user message having information for one of said applications and a header pointing to one of said applications, said terminal further comprising means for addressing said information to a respective application according to said header, the user message having an address field containing the address of the destination of the message and a data field containing said information of the user message, wherein said header is disposed in said data field.

2. A terminal according to claim **1**, wherein said user message is one of a short message, a message according to a standardized Short Message Service (SMS) message, a message according to a standardized R data field message, a message according to a standardized Unstructured Supplementary Service Data (USSD) message, a message according to a standardized Service Operator Code (SOC) message, and a message according to a wireless packet radio service.

3. A terminal according to claim **1**, wherein said information and said header comprise ASCII characters.

4. A terminal according to claim **1**, wherein the terminal is a mobile station having means for making and receiving phone calls over a mobile communication network.

5. A terminal as in claim 1, wherein said information that is received by at least one of said plurality of applications varies from one instance of a received user message to another instance of a received user message.

6. A terminal according to claim 1, wherein said header of said user message directs said information in said message to said one of said applications.

7. A terminal according to claim 1, wherein the wireless communicated user message is received in a quick transmission reserving the communication channel for a short period.

8. A terminal for a communication network, the terminal comprising a plurality of applications for displaying information and processing information and further comprising wireless communication means for communicating user messages, wherein said terminal comprises means for sending information relating to one of said applications in a user message over wireless communication and means for adding a header to the user message, the header indicating a respective application that the information relates to, the user message having an address field containing the address of the destination of the user message and a data field containing said information of the message, wherein said header is disposed in said data field.

9. A terminal according to claim 8, wherein said user message is one of a short message, a message according to a standardized Short Message Service (SMS) message, a message according to a standardized R data field message, a message according to a standardized Unstructured Supplementary Service Data (USSD) message, a message according to a standardized Service Operator Code (SOC) message, and a message according to a wireless packet radio service.

10. A terminal according to claim 8, wherein said information and said header comprise ASCII characters.

11. A terminal according to claim 8, wherein the terminal is a mobile station having means for making and receiving phone calls over a mobile communication network.

12. A terminal according to claim 8, wherein the user message is sent over wireless communication in a quick transmission reserving the communication channel for a short period.

13. A mobile station, comprising a plurality of applications for displaying information and processing information and further comprising wireless communication means for communicating short messages having information in the form of characters, wherein the mobile station comprises means for receiving wireless communication short messages having information for one of said applications and a header pointing to said one of said applications, and means for addressing the information to said one of said applications according to said header.

14. A mobile station according to claim 13, wherein the short message has an address field containing the address of the destination of the message and a data field containing the information of the message, and wherein said header is located in said data field.

15. A mobile station according to claim 13, wherein the short message has an address field containing the address of the destination of the message and a data field containing the information of the message, and wherein that said header is located in said address field.

16. A mobile station according to claim 13, wherein the mobile station further comprises a user interface, and wherein at least one of said plurality of applications is a user accessible application enabling a user of the mobile station to input and modify information in an application using the user interface.

17. A mobile station according to claim 13, wherein said header of said short messages directs said information in said messages to said one of said applications.

18. A mobile station, comprising a plurality of applications for displaying information and processing information and further comprising a wireless communication means for communicating short messages having information in the form of characters, wherein the mobile station comprises means for processing information relating to one of said applications into characters and for sending the processed information in a short message over wireless communication and means for adding a header to the short message, the header indicating a respective application that the information relates to.

19. A mobile station according to claim 18, wherein the short message has an address field containing the address of the destination of the message and a data field containing the information of the message, and wherein said header is located in said data field.

20. A mobile station according to claim 18, wherein the short message has an address field containing the address of the destination of the message and a data field containing the information of the message, and wherein said header is located in said address field.

21. A mobile station according to claim 18, wherein the mobile station further comprises a user interface, and wherein at least one of said plurality of applications is a user accessible application for enabling a user of the mobile station to input and modify information in an application using the user interface.

22. A method of transferring data between a first device and a second device that is remote from the first device, both the first device and the second device being one of a mobile station capable of communicating over a mobile communications network and a server connected to the mobile communications network, comprising steps of:

retrieving a data entry from an application of a plurality of applications of the first device, said application containing a plurality of data entries each having a number of data fields individual ones of which are separated by field separators,

transmitting said retrieved data entry to the second device in a short message via the mobile communications network, and

receiving said retrieved data entry at the second device and storing, based on said field separators, the data fields of the received data entry in corresponding data fields in a corresponding application of the second device.

23. A method according to claim 22, wherein the short message comprises a header for indicating, to the second device, which application of a plurality of applications supported by said second device that said data entry relates to.

24. A method according to claim 23, wherein the short message is divided into an address field portion containing the address of the second device and a data portion containing said data entry, and wherein said header indicating the application that said data entry relates to is added to said data portion before transmitting said data entry to the second device.

* * * * *