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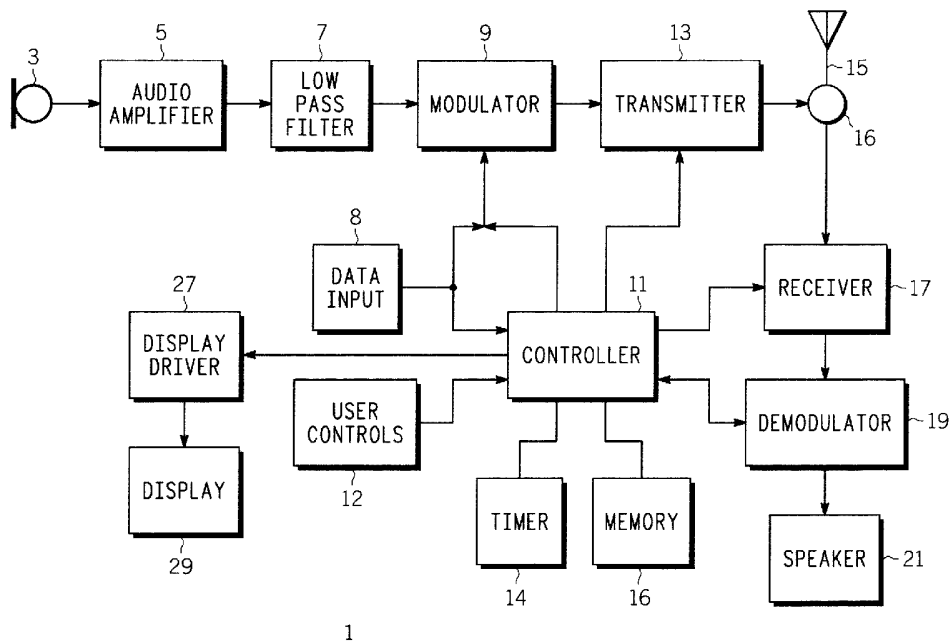
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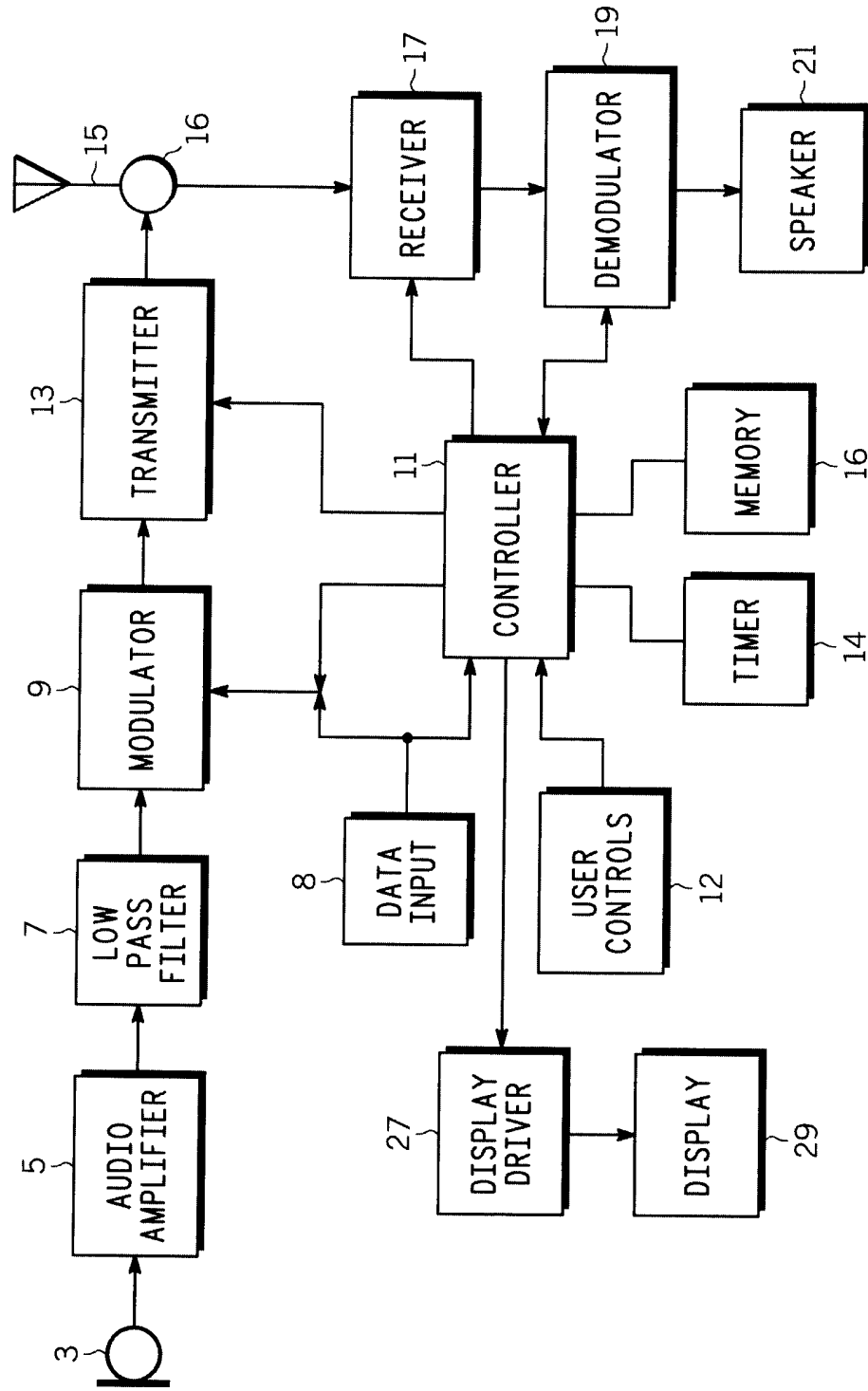
(56) Documents Cited:
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US 5797089 A
Nokia 9110 Communicator Users Manual
<http://www.nokia.com/phones/9110/userguide.html>
(pages 69-70)

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Other: **Online: WPI, EPODOC, JAPIO**

(54) Abstract Title: **Selective turn on of mobile device RF module**

(57) A mobile station for use in a mobile communication system, the mobile station including a display for displaying information to a user and controller means for controlling operation of the display wherein the controller means is operable to select one of two modes in which the display is operated, namely a first mode in which a RF portion of the mobile station is not activated and a second mode in which a RF portion of the mobile station is activated. When the RF portion is not activated the advantages include : faster turn on time (as the device does not attempt to register) and better battery conservation.





TITLE: MOBILE COMMUNICATION STATIONS**FIELD OF THE INVENTION**

5 The present invention relates to mobile communications stations.

BACKGROUND OF THE INVENTION

10 Mobile radio communications systems, for example cellular telephony or mobile radio communications systems, typically provide for radio telecommunication links to be arranged between a plurality of mobile subscriber or user terminals, often referred to in the art as mobile stations (MSs). The term 'mobile station' (MS) generally includes both hand-portable and vehicular mounted radio units, radiotelephones and like radio communications units.

15 Mobile radio communications systems are distinguished from fixed communications systems, such as the public switched telephone networks (PSTNs), principally in that mobile stations can move in geographical location to accompany their user and in doing so encounter varying radio propagation environments.

20 Mobile radio communications systems and mobile stations used in them may operate in one of two main modes, namely a TMO (trunked mode of operation) and a DMO (direct mode of operation). TMO communications use the fixed infrastructure supplied by the system operator, e.g. known in some systems described further below as the SwMI (Switching and Management Infrastructure) including for example base transceiver stations (BTSS), to deliver communications from one

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terminal, e.g. the MS of one user or operator, to that of one or more others terminals, e.g. the MS of one or more other users. In contrast, DMO is a method that provides the capability of direct communication between two or more MSs without any associated operator's system infrastructure. Some MSs may be dual mode operating using either TMO or DMO as appropriate.

In a TMO radio communications system, each BTS has associated with it a particular geographical coverage area (or cell). The cell defines a particular range over which the BTS can maintain acceptable communications with MSs operating within the cell. Often cells are combined to produce an expanded system coverage area. Furthermore, cells are often grouped into location areas for the purposes of tracking a MS within the coverage area whilst minimising location-updating signalling.

In the field of this invention, mobile communications systems are known which operate according to TETRA (TErrestrial Trunked Radio) standards are known. TETRA standards are operating protocols which have been defined by the European Telecommunications Standards Institute (ETSI). The present invention is useful in (but not exclusively in) TETRA systems, i.e. systems operating according to TETRA standards. Such systems are designed for use for example by organisations, particularly safety and emergency services such as the police, ambulance and fire services.

Currently available TETRA systems operate in either TMO or DMO to send a communication from a transmitting MS to one or more receiving MSs.

MSs for use in mobile communication systems are often powered by a battery carried in the MS. In known MSs,

when a user enters a control signal, usually by pressing
a control button or key and entering a PIN (personal
identification number), the MS becomes operational. All
functions including the RF capabilities of the MS are
5 thereby activated together. If used in a TMO system, the
MS begins to send messages to the system infrastructure
to register with the infrastructure to begin
communications service by the infrastructure.

10 There is a considerable drain on the battery as soon
as the RF portion of the MS becomes is activated.
Furthermore the full powering on procedure can be slow
and inconvenient.

15 **SUMMARY OF THE PRESENT INVENTION**

According to the present invention there is provided
a mobile station (MS) for use in a mobile communication
system the mobile station including a display for
displaying information to a user and controller means
20 for controlling operation of functions of the MS
including the display, wherein the controller means is
operable to select one of two modes in which the display
is operated, namely a first mode in which a RF portion
of the mobile station is not activated and a second mode
25 in which a RF portion of the mobile station is
activated.

The mobile station may be one which is capable of use
in TMO and/or in DMO.

30 The present inventor has appreciated that the prior
art procedure of automatically activating the RF portion
of a MS is not necessary, and display of information by
the display of the MS without automatically activating
the RF portion can have benefits. For example, where

several radios are stored together, users may have a problem identifying their own radio or the software version currently used in the radio. The invention allows a MS such as a radio to display quickly user information such as the radio identity number (e.g. the so called 'ISSI' or short subscriber identity) or the operational software version currently installed on the MS, without the undesirable delay and energy drain caused by activating the RF portion of the MS.

The MS according to the invention may be a radio, radiotelephone, data terminal, personal digital assistant or like device for radio communication. The MS may be a handset.

The display of the MS according to the invention may be operated in the first mode by a signal produced when the user presses or touches a button or key. The display may be turned off by the user by a further signal, e.g. produced by the same button or key, e.g. by the user releasing the button or key.

Information to be displayed in the first mode may be information normally already stored in the MS's memory, e.g. its flash memory, e.g. the MS's ISSI or the MS's operational software version as mentioned earlier, or the MS phone number, its owner name, its MNI (Mobile Network Identity or identity of the network in which the MS operates), the owner's equipment ID and so on. This usual information can also be added to if needed. In order to make the information user friendly, the user can configure this information using currently available tools to download/configure the MS. Usually this operation will basically update a zone of the memory known as the codeplug.

The information displayed in the second mode may be any of the information usually displayed by the display of a MS when the RF portion of the MS has been activated, e.g. related to current communication functions of the MS. Entry of a PIN into the MS by the user may be required before the second mode is fully activated or operational. In contrast, display of information in the first mode may be possible without any entry of a PIN or other user entered identity information.

The display employed in the MS according to the invention may be one of the electro-optical displays known for use in electronic handsets, e.g. a liquid crystal display or an electroluminescent display.

According to the present invention in a second aspect there is provided a method of operation in a mobile station which includes controlling information displayed to a user by a display by selecting one of two modes in which the display is operated, namely a first mode in which a RF portion of the mobile station is not activated and a second mode in which a RF portion of the mobile station is activated.

The mobile station and method according to the present invention may be operable using procedures defined in a standard communications system operating protocol such as that of TETRA.

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

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BRIEF DESCRIPTION OF THE ACCOMPANYING DRAWINGS

FIG. 1 is a block schematic diagram of a mobile station.

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DESCRIPTION OF EMBODIMENTS OF THE INVENTION

As shown in FIG. 1, a MS which is a radio unit 1 for use in mobile communications includes a microphone 3 connected in turn to an audio amplifier 5 and a low pass filter 7. Speech of a user is detected by the microphone 3 which delivers a corresponding low frequency electrical signal to the amplifier 5 in which it is amplified and then filtered by the low pass filter 7.

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The output of the filter 7 is applied to a modulator 9 operating under control of a controller 11. In a conventional way, using as its input the output of the filter 7, the modulator 9 produces a modulation signal. The modulator 9 may alternatively receive data from a user data input 8 and produce a corresponding modulation signal. The modulation signal produced by the modulator 9 is applied to a separately produced RF carrier signal in a transmitter 13. A modulated RF signal is thereby produced by the transmitter 13 and is passed via a circulator 16 to an antenna 15 from which the RF signal is sent to a distant receiver (not shown), e.g. a similar radio unit of another user with whom the first mentioned user is communicating.

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An incoming RF signal from the distant receiver is received by the antenna 15 and passed via the circulator 16 in turn to a receiver 17 and a

demodulator 19 also operating under control of the processor 11. The receiver 17 and demodulator 19 are known circuits which detect the received RF signal and extract a baseband electrical signal representing speech of a distant user. The extracted signal is converted to audible form by a speaker 21.

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Alternatively, the extracted baseband electrical signal could represent data and produce a data output via a data output device.

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The controller 11, which in practice may comprise one or more dedicated microprocessors, controls functional operations within the radio unit 1. The controller 11 is connected to a timer 14 to control timing of operations of the controller 11 and functional units controlled by it and a memory 16 which stores data and program files for use by the controller 11. Signals to be displayed as information to a user are issued by the controller 11 and displayed by a display 29 which is selectively addressed by a display driver 27.

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The radio unit 1 has user controls 12 including control buttons and keys to enter control signals which are passed to the controller 11.

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The controller 11 has two modes of operation to provide signals for information display by the display 29 via the display driver 27. In the first mode, a signal from the user controls 12 (e.g. a particular button of the user controls) is received by the controller 11 and causes operation of the display 29 without any activation of the RF portions of the radio unit 1. The controller 11 recognises the received signal and generates a special interrupt service routine (ISR) message. By this routine, selective information about the unit 1 is retrieved from the memory 16 and is

displayed on the display 29 without operation of the RF portions of the unit 1, namely the transmitter 13 and the receiver 17. The first mode may be selected as a result of pressing a single button or key by a user. The
5 button may be a PTT ('push to talk') button commonly used on a mobile radio handset. The information to be displayed by this operation may be displayed rapidly. The user may perceive the display 29 in the first mode to operate virtually instantaneously when the
10 appropriate key or button is pressed.

Examples of the information displayed in the first mode may include information about the radio unit 1 such as the identity number ('ISSI') of the radio unit, the latest operating software version which has been
15 installed on the radio unit 1, the organisation owning the radio unit 1, and the particular department's or user's name. The user is thus able to see the basic details of the radio unit 1 rapidly without powering on the RF portions.

20 In the first mode, the information displayed by the display 29 may be displayed until a further control signal is entered by the user. This may be when the button first pressed by the user is released.

A second mode may be started in the radio unit 1 when
25 desired by a user. This may be achieved for example by the user pressing or touching a further button or key or by use of the same key as for display of information in the first mode but in a different manner, e.g. by pressing the button twice in a short period of time,
30 e.g. less than one second. When a user signal to begin operation in the second mode has been entered, a message may be displayed (under control of the controller 11) requiring the user to enter a PIN. The PIN entered by

the user via the user controls 12 (or data input 8) may be checked by the controller 11 against a PIN already stored in the memory 16 before further activity in the second mode proceeds.

- 5 In the second mode, e.g. after successful entry of a PIN, all portions of the radio unit 1 including the transmitter 13 and the receiver 17 are activated. The display 29 displays in the second mode information relating to communications functions of the unit 1 in a
- 10 usual way, including the network to which the unit is connected, the number being called, and so on.

CLAIMS

1. A mobile station for use in a mobile communication system, the mobile station including a display for
5 displaying information to a user and controller means for controlling operation of the display wherein the controller means is operable to select one of two modes in which the display is operated, namely a first mode in which a RF portion of the mobile station is not
10 activated and a second mode in which a RF portion of the mobile station is activated.
2. A mobile station according to claim 1 wherein the mobile station is operable in the first mode to display user information comprising one or more of the mobile
15 station identity, an operational software version currently installed on the mobile station, and owner of the mobile station.
3. A mobile station according to claim 1 or claim 2 wherein the mobile station is a handset for use in radio
20 communications.
4. A mobile station according to any one of the preceding claims including a user button or key coupled to the controller, wherein the display is operable in the first mode by a signal produced when the user
25 presses or touches the button or key.
5. A mobile station according to claim 4 wherein the display may be turned off by the user by a further signal produced by the same button or key.
6. A mobile station according to claim 5 wherein the
30 further signal is produced by the user releasing the button or key.
7. A mobile station according to any one preceding claim wherein information displayed in the first mode is

configurable by a user and is stored in a codeplug, so that the information is in a form selected by the user.

5 8. A mobile station according to any one preceding claim claim 1 wherein the display is a liquid crystal display or an electroluminescent display.

9. A mobile station according to any one of the preceding claims and which is operable according to standard TETRA communication procedures.

10 10. A mobile station according to any one of the preceding claims and substantially as described herein with reference to the accompanying drawing.

15 11. A method of operation in a mobile station which includes controlling information displayed to a user by a display by selecting one of two modes in which the display is operated, namely a first mode in which a RF portion of the mobile station is not activated and a second mode in which a RF portion of the mobile station is activated.

20 12. A method according to claim 11 and substantially as described herein with reference to the accompanying drawing.



INVESTOR IN PEOPLE

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12

Examiner: Steve Evans

Claims searched: All

Date of search: 28 July 2004

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular reference
X	1-11	EP 1199900 A2 (NEC) - Whole document
X	1-11	WO 02/056573 A (SIEMENS) - English language abstract
X	1-11	US 6560274 B1 (SIEMENS) - Whole document
X	1-11	Nokia 9110 Communicator Users Manual http://www.nokia.com/phones/9110/userguide.html (pages 69-70)
X	1-11	EP 1033859 A2 (SONY) - Whole document
X	1-11	US 5797089 A (ERICSSON) - Whole document

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^W :

H4L

Worldwide search of patent documents classified in the following areas of the IPC⁰⁷

H04B; H04M; H04Q

The following online and other databases have been used in the preparation of this search report

Online: WPI, EPODOC, JAPIO



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X	1-11	Nokia 9110 Communicator Users Manual http://www.nokia.com/phones/9110/userguide.html (pages 69-70)
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X	1-11	US 5797089 A (ERICSSON) - Whole document

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&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^W :

H4L

Worldwide search of patent documents classified in the following areas of the IPC⁰⁷

H04B; H04M; H04Q

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