

MOBILE COMMUNICATION APPARATUS HAVING AUTO-ANSWER-
HOLD AND METHOD THEREFOR

5 BACKGROUND

Occasionally a cellular phone user may receive a call while in a situation where it may not be convenient for the user to talk. For example, the user may be in a quiet environment (e.g., a movie theater) where the user may not be able to talk freely. Likewise, the user may be in an environment where it may be
10 difficult for the user to hear the incoming call (e.g., a crowded airport) or the user may be currently occupied with another task and unable to talk. However, the user may still desire to receive the call rather than to simply ignore it.

Thus, there is a continuing need to improve the features available on
15 portable communication devices.

BRIEF DESCRIPTION OF THE DRAWINGS

The subject matter regarded as the invention is particularly pointed out and distinctly claimed in the concluding portion of the specification. The invention, however, both as to organization and method of operation, together
20 with objects, features, and advantages thereof, may best be understood by reference to the following detailed description when read with the accompanying drawings in which:

FIG. 1 is an illustration of a portable communication device in

accordance with an embodiment the present invention;

FIG. 2 is a flow chart of a method in accordance with an embodiment of the present invention; and

FIG. 3 is a schematic representation of at least a portion of a portable
5 communication device in accordance with an embodiment of the present invention.

It will be appreciated that for simplicity and clarity of illustration, elements shown in the figures have not necessarily been drawn to scale. For
10 example, the dimensions of some of the elements may be exaggerated relative to other elements for clarity. Further, where considered appropriate, reference numerals may be repeated among the figures to indicate corresponding or analogous elements.

15 DETAILED DESCRIPTION

In the following detailed description, numerous specific details are set forth in order to provide a thorough understanding of the invention. However, it will be understood by those skilled in the art that the present invention may be practiced without these specific details. In other instances, well-known
20 methods, procedures, components and circuits have not been described in detail so as not to obscure the present invention.

Some portions of the detailed description which follow are presented in terms of algorithms and symbolic representations of operations on data bits or binary digital signals within a computer memory. These algorithmic descriptions and representations may be the techniques used by those skilled in the data processing arts to convey the substance of their work to others skilled in the art.

An algorithm is here, and generally, considered to be a self-consistent sequence of acts or operations leading to a desired result. These include physical manipulations of physical quantities. Usually, though not necessarily, these quantities take the form of electrical or magnetic signals capable of being stored, transferred, combined, compared, and otherwise manipulated. It has proven convenient at times, principally for reasons of common usage, to refer to these signals as bits, values, elements, symbols, characters, terms, numbers or the like. It should be understood, however, that all of these and similar terms are to be associated with the appropriate physical quantities and are merely convenient labels applied to these quantities.

Unless specifically stated otherwise, as apparent from the following discussions, it is appreciated that throughout the specification discussions utilizing terms such as "processing," "computing," "calculating," "determining," or the like, refer to the action and/or processes of a computer or computing system, or similar electronic computing device, that manipulate and/or transform data represented as physical, such as electronic, quantities within the computing system's registers and/or memories into other data

similarly represented as physical quantities within the computing system's memories, registers or other such information storage, transmission or display devices.

Embodiments of the present invention may include apparatuses for

5 performing the operations herein. This apparatus may be specially constructed for the desired purposes, or it may comprise a general purpose computer selectively activated or reconfigured by a computer program stored in the computer. Such a computer program may be stored in a computer readable storage medium, such as, but is not limited to, any type of disk

10 including floppy disks, optical disks, CD-ROMs, magnetic-optical disks, read-only memories (ROMs), random access memories (RAMs), electrically programmable read-only memories (EPROMs), electrically erasable and programmable read only memories (EEPROMs), magnetic or optical cards, or any other type of media suitable for storing electronic instructions, and

15 capable of being coupled to a computer system bus.

The processes and displays presented herein are not inherently related to any particular computer or other apparatus. Various general purpose systems may be used with programs in accordance with the teachings herein, or it may prove convenient to construct a more specialized apparatus to

20 perform the desired method. The desired structure for a variety of these systems will appear from the description below. In addition, embodiments of the present invention are not described with reference to any particular programming language. It will be appreciated that a variety of programming

languages may be used to implement the teachings of the invention as described herein.

Embodiments of the present invention may include portable communication devices (e.g., cell phones, wireless communication devices, etc.).

- 5 Types of cellular radiotelephone communication systems intended to fall within the scope of the present invention include, although not limited to, Direct Sequence - Code Division Multiple Access (DS-CDMA) cellular radiotelephone communication systems, Global System for Mobile Communications (GSM) cellular radiotelephone systems, North American Digital Cellular (NADC) cellular
10 radiotelephone systems, Time Division Multiple Access (TDMA) systems, and Extended-TDMA (E-TDMA) cellular radiotelephone systems, and the like.

Turning to FIG. 1, an embodiment 100 in accordance with the present invention is described. Embodiment 100 may comprise a portable communication device 110 such as a mobile communication device (e.g., cell phone), a two-way
15 radio communication system, a one-way pager, a two-way pager, a personal communication system (PCS), a portable computer, or the like. Although it should be understood that the scope and application of the present invention is in no way limited to these examples.

As explained in more detail below, portable communication device 110
20 may provide a user with the ability to temporarily place an incoming call on hold until the user desires to accept the call. Upon receiving an incoming call, a display 50 may provide identification information associated with the origin of the call. If a user is temporarily unable to talk (e.g., the user may be temporarily busy, may be in a quiet environment, such as a theater, or in a noisy environment, such

as an airport), the user may enable an auto-answer feature by depressing an Auto-Answer Hold (AAH) button 25, although the scope of the present invention is not limited in this respect.

While the caller is on hold, display 50 may be used to indicate how long the incoming call is on hold. Furthermore, in alternative embodiments, a prerecorded message may be transmitted by portable communication device 110 notifying the caller that the user is temporarily unable to talk. Although the scope of the present invention is not limited in this respect, the user may select from a variety of prerecorded messages that are either associated with AAH button 25 or feature buttons 20-21.

Referring to FIG. 2, a method of placing on hold an incoming communication from a communication system in accordance with an embodiment of the present invention is provided. Upon receiving a call with portable communication device 110 (see FIG. 1) from a communication system, block 201, identification information associated with the incoming call (e.g., caller ID) may be displayed, although the scope of the present invention is not limited in this respect. The user may use the identification information to decide whether to take the call, ignore the call, or to temporarily place the call on hold with an auto-answer hold feature.

The user may also use the identification information to decide to transfer the incoming call to a voicemail system, block 202. For a variety of reasons, such as the user is not in an environment conducive to talking or the user does not wish to accept the incoming call based on the identification

information, the user may decide to transfer the incoming call to voicemail by enabling this option on portable communication device 110, block 214.

If a user does not send the incoming communication to voicemail, portable communication device 110 may acknowledge the call from the communication system, block 203. At this point, the user may have the option to decide whether to enable the auto-answer hold feature, block 204. The user may decide not to enable the auto-answer mode, but rather, decide to talk with the caller, block 205, if the talk feature is enabled, block 208. However, the user may also decide not to enable the auto-answer feature and not to talk with the caller at which point portable communication device 110 may be disconnected from the incoming call, block 206.

If the auto-answer feature is enabled, the microphone may be muted and a predetermined message may be transmitted by the portable communication device, block 207. For example, a prerecorded message, such as "Hello, this is Joe. Please wait a moment while I prepare to answer the phone." may be transmitted. In alternative embodiments, multiple greetings may be transmitted from the portable communication device depending on such factors as how formal or casual is the greeting, how long the user expects the call to be on hold, or on the nature of the call as suggested by the identification information.

Both the type and number of prerecorded messages that are transmitted may be selected by the user, or alternatively, may be determined by predefined rules that the user may have created. For example, the user

may customize the portable communication device so that calls received from particular callers, or received at particular times of the day, result in one message being transmitted versus another. It should be understood, however, that the type or number of messages sent, how the message may
5 be selected, and the muting of the microphone are not intended as limitations upon the scope of the present invention.

In this particular embodiment, after the hold message is transmitted by the portable communication device, a timer may be set to record how long the incoming call has been on hold, block 209. The hold time may be presented
10 to the user, for example, through display 50 of portable communication device 110 (see FIG. 1), block 210. While the call is on hold, the portable communication device may transmit additional messages (e.g., a heartbeat message) that reminds the caller that they are temporarily on hold. In alternative embodiments, the portable communication device may periodically
15 repeat the original hold message that was transmitted when the auto-answer feature was enabled.

While the auto-answer mode is enabled, and the incoming call is on hold, the user may decide to then transfer the incoming call to voicemail, blocks 211 and 214. For example, the user may change his mind about
20 accepting the call because the user has received another call or may not be able to relocate in a timely manner to a environment better suited to talk. In alternative embodiments, portable communication device 110 may permit the caller to transfer from hold to the user's voicemail by pressing a button (e.g.,

the "#" button).

Continuing with the method shown in FIG. 2, the user may continue to keep the incoming call on hold as long as desired. If the auto-answer mode is still enabled, block 212, the portable communication device may continue to
5 update the timer recording the hold time, block 209, and provide the user with the option of transferring the call to voicemail, block 211. Once the user is prepared to talk, the user may disable the auto-answer feature and enable the talk feature on the portable communication device, block 213. It should be understood, however, that the user need not disable the auto-answer
10 feature and may, if desired, simply terminate the incoming communication.

Turning to FIG. 3, an embodiment for portable communication device 110 is provided. As shown, portable communication device 110 may include a receiver 40 that may receive an incoming communication from a communication system (e.g., a base station). Receiver 40 may then provide
15 all or part of the incoming message to a processor 10 that may comprise, for example, a microprocessor, a digital signal processor, a microcontroller, or the like. However, it should be understood that the scope of the present invention is not limited to these examples.

Portable communication device 110 may also include feature buttons 20, 20 25, and 21, labeled Func1, Func2, and Func3, respectively. Feature buttons 20, 25, and 21 may be used to enable an auto-answer hold feature in accordance with the method illustrated in FIG. 2. In this particular embodiment, feature button 25 may be used to enable the auto-answer mode, and feature buttons 20-21 may

be used to select the prerecorded message to be transmitted while the caller is on hold, although the scope of the present invention is not limited in this respect.

Feature buttons 20, 25, and 21 may provide processor 10 with control signals, labeled Func1_sig, Func2_sig, and Func3_sig, to indicate the choices made by

5 the user.

Depending on the logical value of the control signals and the status of the incoming call, portable communication device 110 may transmit one or more predetermined messages. For example, portable communication device 110 may comprise a speech control subsystem 60 that, among other things, may select the
10 source for the outgoing message to be transmitted by a transmitter 70. For example, speech control subsystem 60 may select a prerecorded message stored in a memory 80 or transmit the message provided by the user through a microphone 90, although the scope of the present invention is not limited in this respect. As discussed earlier, if portable communication device 110 transmits a
15 predetermined message stored in memory 80, it may be desirable to mute or disconnect microphone 90 from speech control subsystem 60 so that noise from the user or the environment may not be transmitted while the caller is on hold.

In this particular embodiment, memory 80 may comprise a flash memory array that stores one or more predetermined messages that may be
20 transmitted while an incoming call is on hold. However, it should be understood that memory 80 may be a variety of storage devices (e.g., read-only memory, electrically erasable and programmable read only memory (EEPROM), and the like) and may also store information other than the

messages to be transmitted during when the auto-answer hold feature is enabled. For example, memory 80 may also store the program instructions used to control the operation of processor 10 and portable communication device 110.

5 Although the scope of the present invention is not limited in this respect, memory 80 may store the message or messages previously recorded by the user that are to be transmitted when the auto-answer hold feature is enabled. Memory 80 may also store generic messages that may be prerecorded by others. For example, memory 80 may store messages
10 recorded by the manufacturer of portable communication device 110 or recorded by the operator of the communication system with which portable communication device 110 is in communication. In this particular embodiment, memory 80 may store two or more messages (e.g., a plurality). However, the scope of the present invention is not limited in this respect as
15 memory 80 may store a single message.

Portable communication device 110 may also comprise a timer 55 that may be used to record how long the auto-answer hold feature has been enabled. As indicated above, the hold time, along with identification information associated with the origin of the incoming call, may be presented
20 to the user on display 50, although the scope of the present invention is not limited in this respect.

By now it should be appreciated that particular embodiments of the present invention provides a method by which an incoming call from a

communication system to a portable communication device may be placed on hold. This may allow the user to relocate to an environment that is more suitable to talk with the caller. One advantage of particular embodiments of the present invention is that the portable communication device may transmit
5 a prerecorded message while the caller on hold. By providing the prerecorded message with the portable communication device, the auto-answer hold feature may be provided independently from the communication system. For example, the auto-answer hold feature may be provided independently of the protocol or bandwidth of the communication system.

10 While certain features of the invention have been illustrated and described herein, many modifications, substitutions, changes, and equivalents will now occur to those skilled in the art. It is, therefore, to be understood that the appended claims are intended to cover all such modifications and changes as fall within the true spirit of the invention.

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What is claimed is:

1. A portable communication device comprising:

a transmitter adapted to provide a predetermined message, wherein the portable communication device is adapted to place a communication on hold and transmit a predetermined message.
2. The portable communication device of claim 1, further comprising a memory device adapted to store the predetermined message.
3. The portable communication device of claim 1, wherein the portable communication device is adapted to transmit a predetermined message that is previously recorded by a user.
4. The portable communication of claim 1, further comprising a receiver adapted to receive an incoming communication from a communication system.
5. The portable communication device of claim 1, further comprising a memory device adapted to store at least two user selectable predetermined messages.
6. A method of placing on hold an incoming communication from a communication system, comprising:

transmitting a prerecorded message from a portable communication device.
7. The method of claim 6, further comprising:

receiving the incoming call with the portable communication device; and

enabling an auto-answer feature on the portable communication device.
8. The method of claim 6, further comprising providing identification information associated with the incoming communication.

9. The method of claim 6, further comprising muting a microphone on the portable communication device.

10. The method of claim 6, further comprising terminating the incoming communication while the portable communication device is on hold.