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(54) **INTELLIGENT MULTIMODE MESSAGE ALERTS**

(57) **ABSTRACT**

(76) Inventor: **Doree Duncan Seligmann**, New York, NY (US)

Correspondence Address:  
**DEMONT & BREYER, LLC**  
**SUITE 250**  
**100 COMMONS WAY**  
**HOLMDEL, NJ 07733 (US)**

An apparatus that intelligently determines how to alert a user to the arrival of an incoming message at a telecommunications terminal, and what information is imparted to the user via the alert, is disclosed. In the illustrative embodiments, the terminal has a processor that makes this determination based on one or more of the following: properties of the incoming message (e.g., who sent the message, a priority level associated with the message, the semantic content of the message, the length of the message, etc.), the time and date (i.e., the "calendrical time"), environmental parameters (e.g., temperature, ambient luminosity, etc.), the user's physiological parameters (e.g., blood pressure, heart rate, etc.), the location of the user, the proximity of other wireless terminals in the vicinity, whether the user is currently receiving another message, and the delivery mechanism of the other message (e.g., voice, text chat, etc.).

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 (52) **U.S. Cl.** ..... **379/373.01**

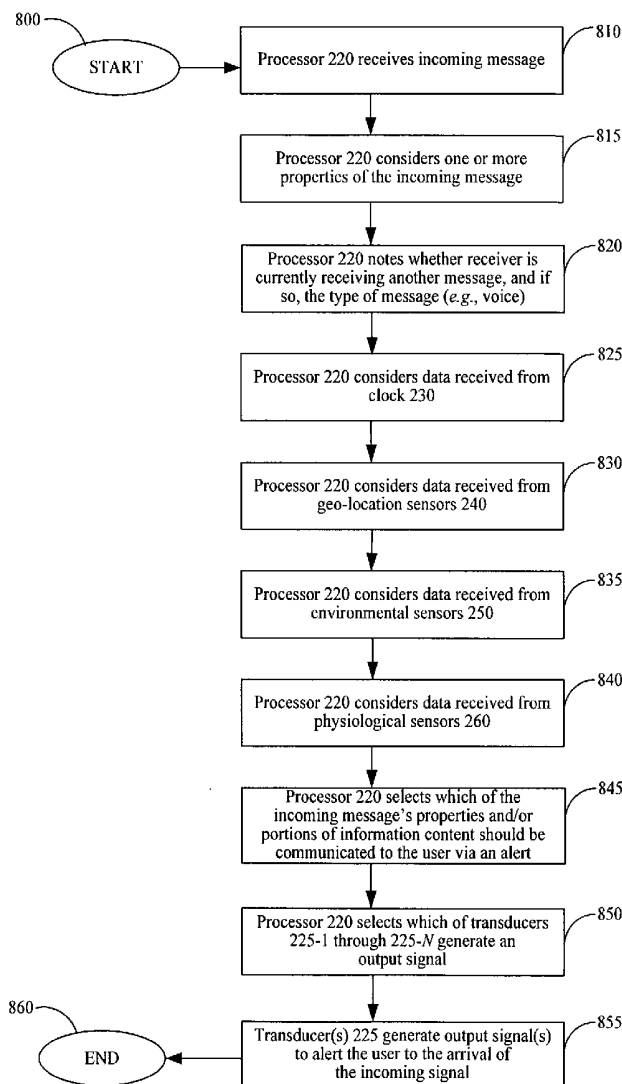
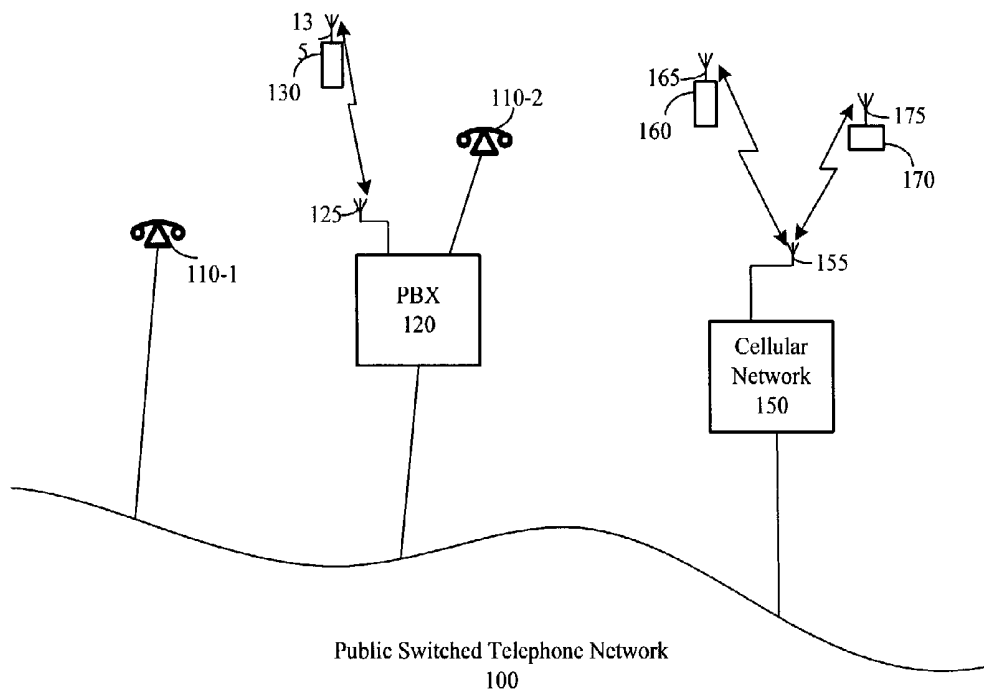


FIG. 1 (Prior Art)



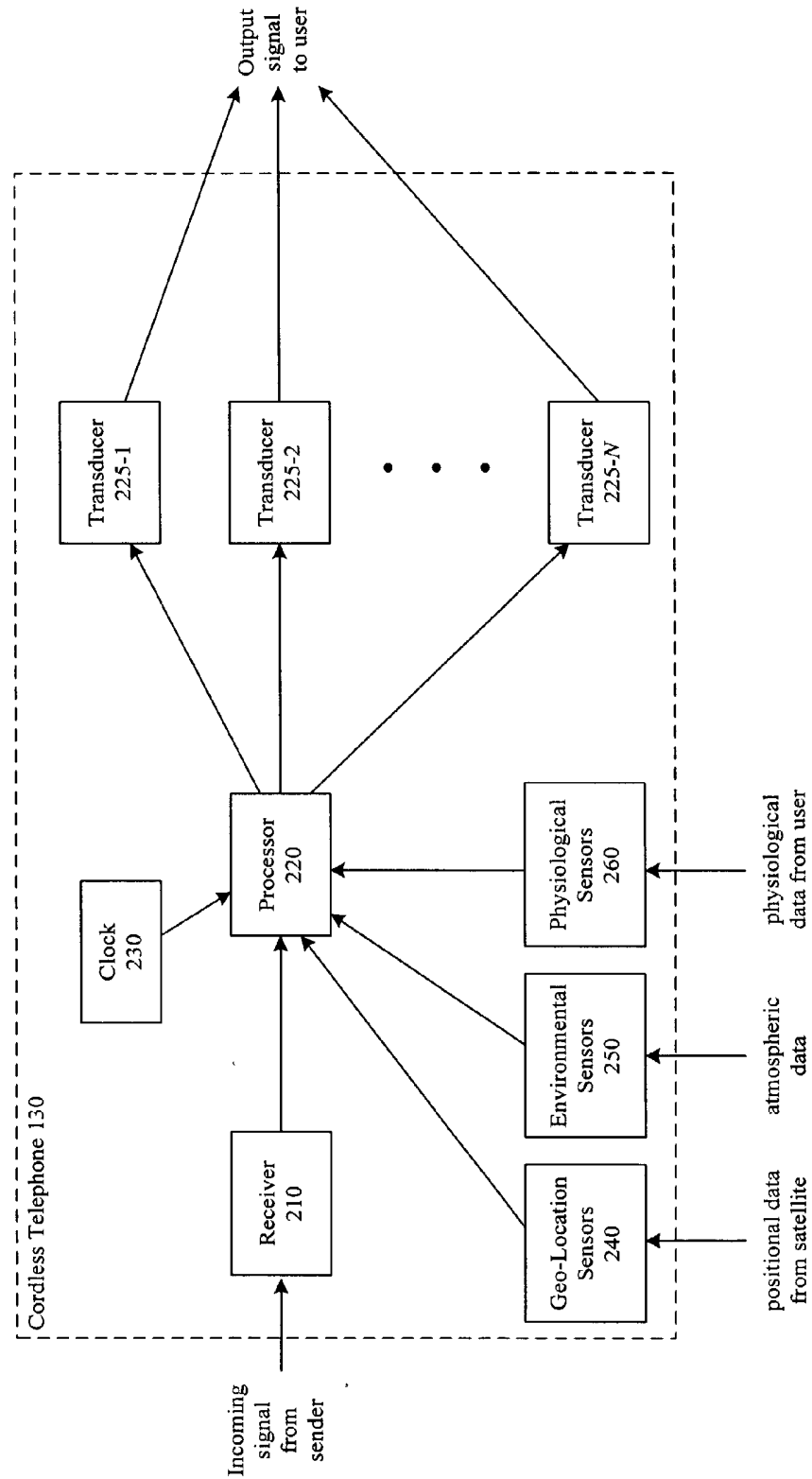


FIG. 2

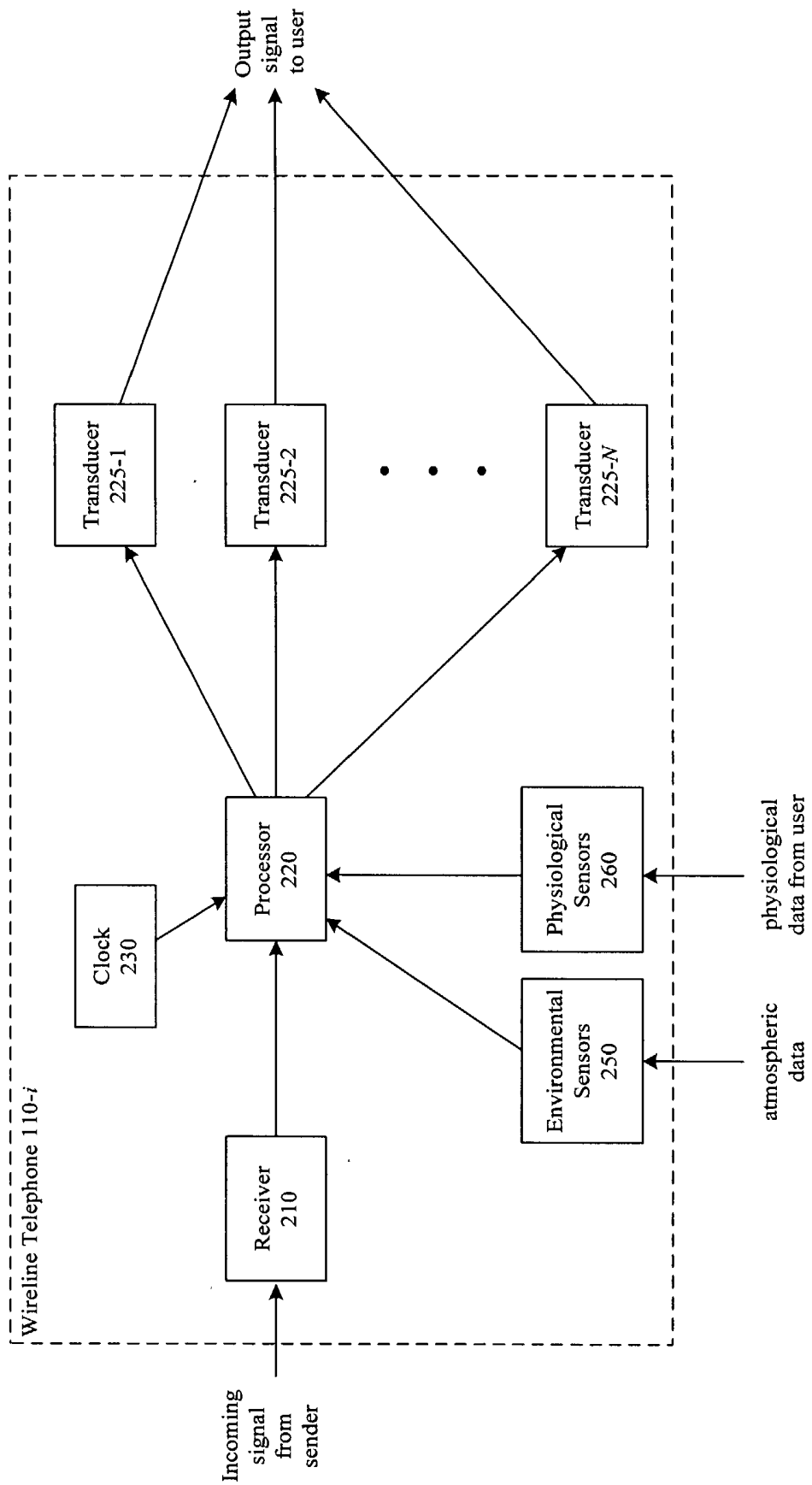


FIG. 3

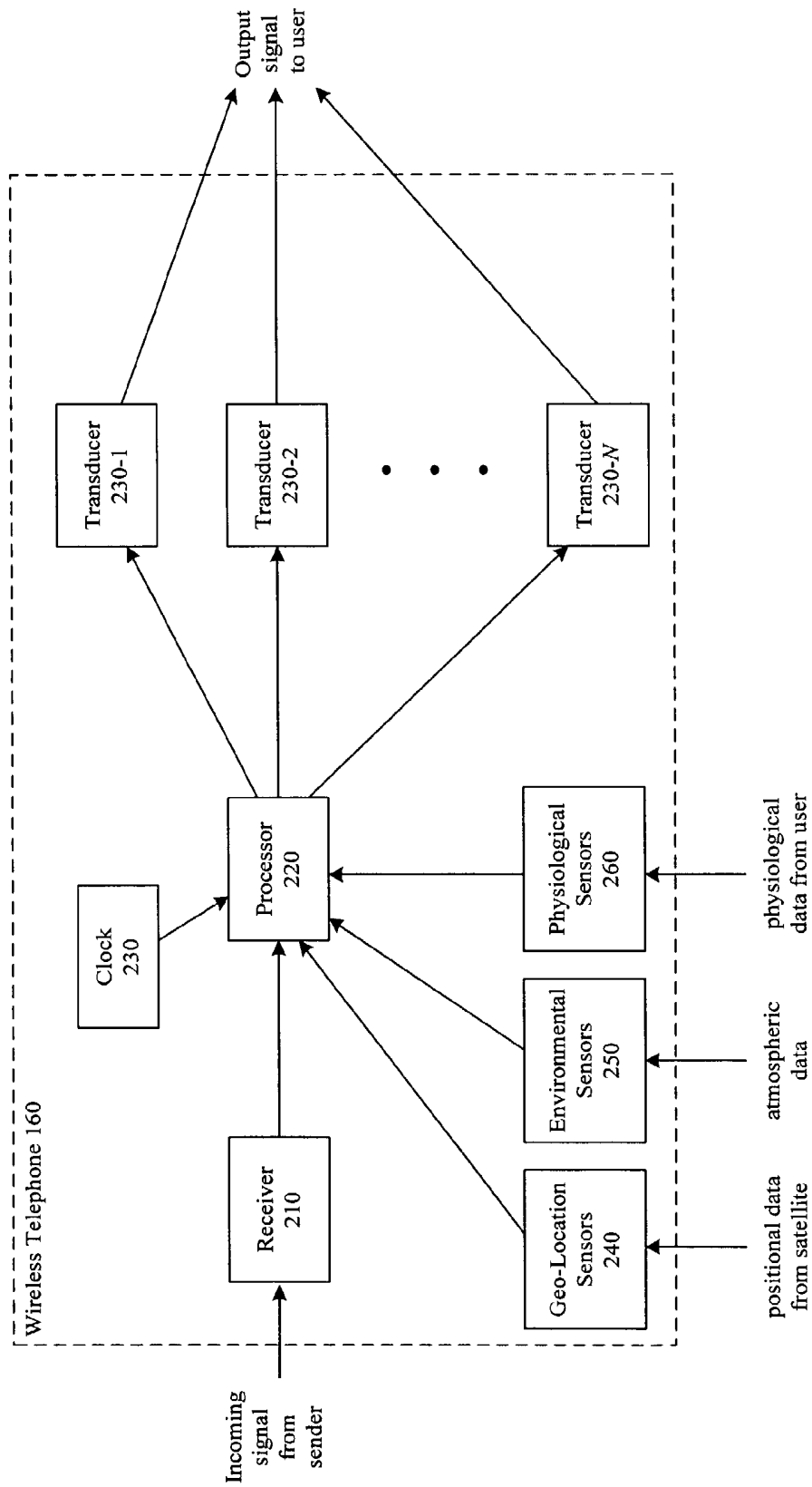


FIG. 4

FIG. 5

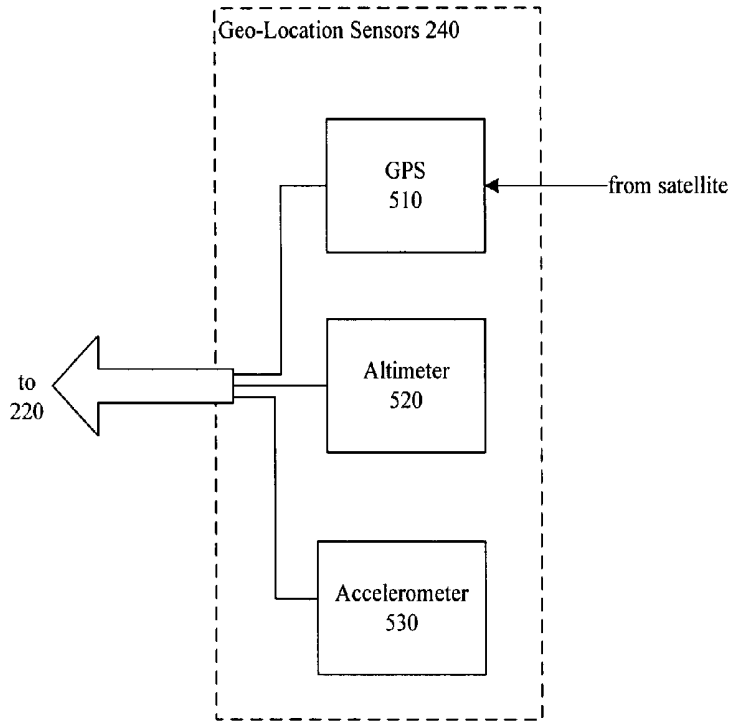


FIG. 6

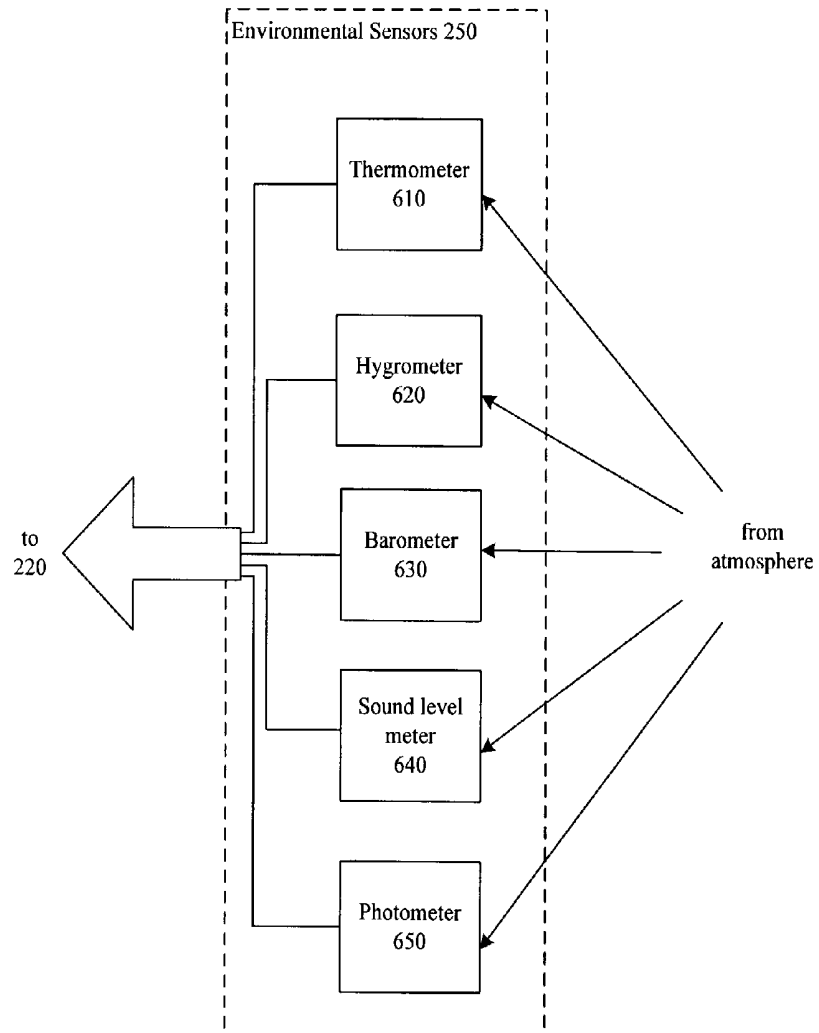


FIG. 7

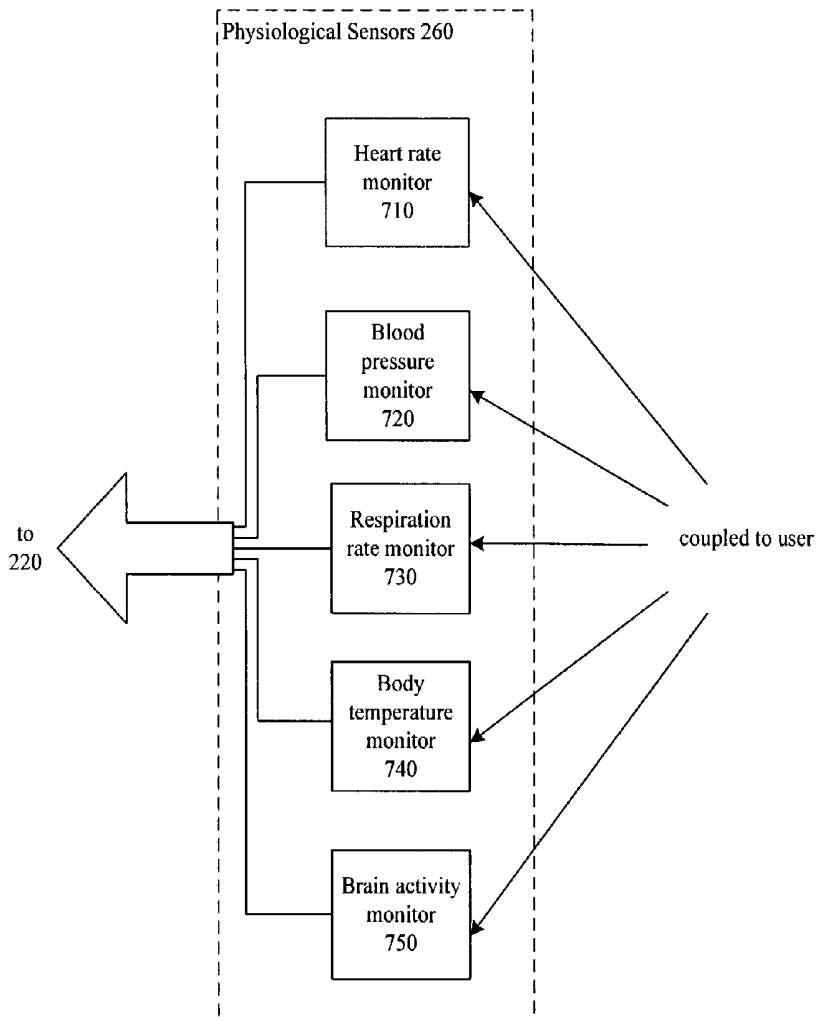
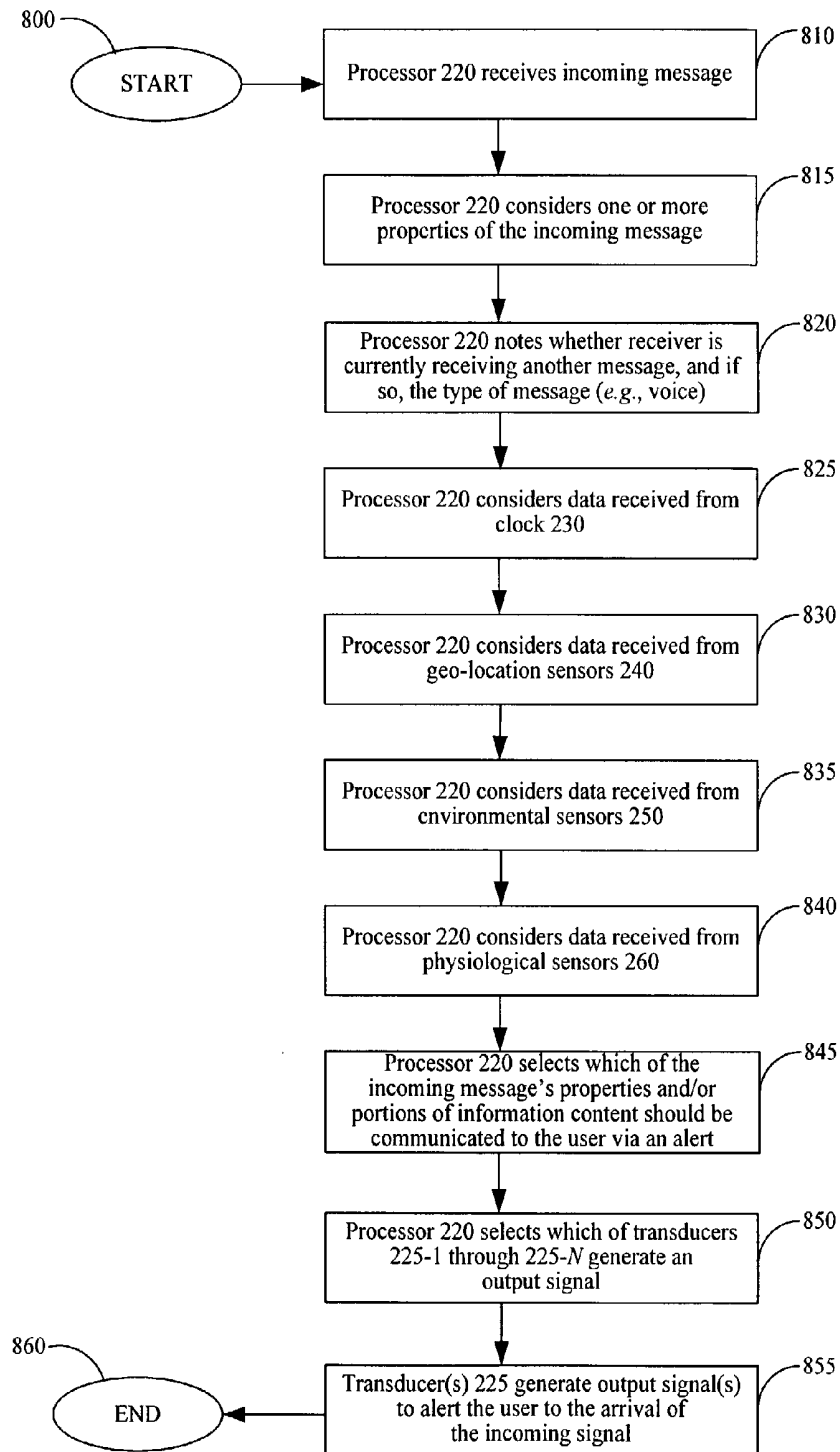


FIG. 8



## INTELLIGENT MULTIMODE MESSAGE ALERTS

### FIELD OF THE INVENTION

[0001] The present invention relates to telecommunications equipment in general, and, in particular, to a telecommunications terminal that intelligently decides how to alert the user to the arrival of an incoming message.

### BACKGROUND OF THE INVENTION

[0002] FIG. 1 depicts a rendering of an exemplary sub-network attached to public switched telephone network (PSTN) 100. The subnetwork comprises: PBX 120, cellular network 150, and five telecommunications terminals: wireline telephones 110-1 and 110-2, cordless telephone 130, wireless telephone 160, and two-way pager 170. As shown in FIG. 1, PBX 120's antenna 125 communicates wirelessly with wireless telephone 130's antenna 135, and cellular network 150's antenna 155 communicates wirelessly with wireless telephone 160's antenna 165 and two-way pager 170's antenna 175. Telecommunications terminals, such as those depicted in FIG. 1, alert a user when the terminal receives an incoming message.

[0003] In the prior art, a telecommunications terminal typically alerts the user to the arrival of an incoming message via some sensory mechanism; most commonly, this mechanism is an acoustic "telephone ring". In some telecommunications terminals, it is possible for the user to specify one of a plurality of such sensory mechanisms; for example, some wireless telephones give the user a choice of an acoustic "telephone ring" or a physical vibration of the telecommunications terminal. However, the sensory mechanism selected by the user applies to all incoming messages.

[0004] In the prior art, some telecommunications terminals alert the user to the arrival of an incoming message via more than one sensory mechanism; for example, a telecommunications terminal with "caller ID" service can provide a visual text message indicating the identity of the caller in addition to an acoustic telephone ring. Again, the sensory mechanisms are the same for all incoming messages.

[0005] The fact that the user can specify which particular alerting mechanism(s) are employed is advantageous, but the techniques for doing so in the prior art are somewhat limited. Therefore, the need exists for a more flexible technique that a user can use to specify the alerting mechanism on his or her telecommunications terminal.

### SUMMARY OF THE INVENTION

[0006] The present invention enables a user to specify the alerting mechanism(s) of a telecommunications terminal without some of the costs and disadvantages for doing so in the prior art. In particular, the illustrative embodiment enables a telecommunications terminal to determine which mechanism(s) to use to alert the user to the arrival of an incoming message based on one or more of the following: some property of the incoming message (e.g., who sent the message, a priority level associated with the message, the semantic content of the message, the length of the message, etc.), the time and date (i.e., the "calendrical time"), environmental parameters (e.g., temperature, ambient luminosity, etc.), the user's physiological parameters (e.g., blood pressure, heart rate, gender, etc.), properties of the caller

(e.g., the caller's gender, age, physiological parameters, etc.), the location of the user, the proximity of other telecommunications terminals in the vicinity, and whether the user is currently receiving another message. For example, it might be appropriate to alert a user via a vibration mechanism rather than an acoustic mechanism in a noisy environment, or when there are many telecommunications terminals nearby

[0007] The illustrative embodiment also enables a telecommunications terminal to determine which properties and/or components of the incoming message should be communicated to the user via the alerting mechanism, also based on the information enumerated above. For example, the visual alerting mechanism of a telecommunications terminal might display the "From" and "Subject" fields of an email message from a known party, but simply display a generic symbol for the arrival of an email message from an unknown party. The illustrative embodiment enables a user to program his or her telecommunications terminal to provide the desired behavior.

[0008] The illustrative embodiment comprises: a receiver for receiving an incoming signal directed to a telecommunications terminal, wherein said incoming signal is characterized by at least one property; a plurality of transducers, wherein each of said transducers can alert a user to the arrival of said incoming signal; and a processor for selecting which of said transducers alert said user based on at least one property of said incoming signal.

### BRIEF DESCRIPTION OF THE DRAWINGS

[0009] FIG. 1 depicts a block diagram of an exemplary subnetwork attached to public switched telephone network (PSTN) 100.

[0010] FIG. 2 depicts a block diagram of cordless telephone 130, as shown in FIG. 1, in accordance with the illustrative embodiment of the present invention.

[0011] FIG. 3 depicts a block diagram of wireline telephone 110-*i*, as shown in FIG. 1, in accordance with the illustrative embodiment of the present invention.

[0012] FIG. 4 depicts a block diagram of wireless telephone 160, as shown in FIG. 1, in accordance with the illustrative embodiment of the present invention.

[0013] FIG. 5 depicts a block diagram of geo-location sensors 240, as shown in FIG. 2 and FIG. 4, in accordance with the illustrative embodiment of the present invention.

[0014] FIG. 6 depicts a block diagram of environmental sensors 250, as shown in FIGS. 2, 3, and 4, in accordance with the illustrative embodiment of the present invention.

[0015] FIG. 7 depicts a block diagram of physiological sensors 260, as shown in FIGS. 2, 3, and 4, in accordance with the illustrative embodiment of the present invention.

[0016] FIG. 8 depicts a flowchart of the operation of processor 220, as shown in FIGS. 2, 3, and 4, in accordance with the illustrative embodiment of the present invention.

### DETAILED DESCRIPTION

[0017] FIG. 2 depicts a block diagram of the salient components of cordless telephone 130, in accordance with the illustrative embodiment of the present invention. Cord-

less telephone **130** comprises: receiver **210**, processor **220**, clock **230**, geo-location sensors **240**, environmental sensors **250**, physiological sensors **260**, and transducers **225-1** through **225-N**, interconnected as shown.

[0018] Clock **230** transmits the current time, date, and day of the week to processor **220** in well-known fashion.

[0019] Geo-location sensors **240** receive positional data, as is described in detail below, and transmit these data to processor **220** in well-known fashion.

[0020] Environmental sensors **250** receive atmospheric data, as is described in detail below, and transmit these data to processor **220** in well-known fashion.

[0021] Physiological sensors **260** receive atmospheric data, as is described in detail below, and transmit these data to processor **220** in well-known fashion.

[0022] Processor **220** receives an incoming message (e.g., a telephone call, a fax, an e-mail, etc.) from a remote user, in well-known fashion, and determines, based on the inputs it receives, as described above, and properties of the incoming message, (1) which transducers should alert the user to the arrival of the incoming message, and (2) what information content from the incoming message should be communicated to the user in the alert. Details concerning how processor **220** makes such determinations are given below.

[0023] The appropriate transducers **225**, as determined above by processor **220**, generate an output signal based on the appropriate information content, again as determined above by processor **220**, in well-known fashion. For example, an acoustic transducer could generate a musical jingle or a human-like voice based on the sender and/or priority of the message, while a visual transducer could display the text in the subject line of an email message or a graphical symbol based on some property of the email message.

[0024] FIG. 3 depicts a block diagram of the salient components of wireline telephone **110-i**, in accordance with the illustrative embodiment of the present invention. Wireline telephone **110-i** comprises: receiver **210**, processor **220**, clock **230**, environmental sensors **250**, physiological sensors **260**, and transducers **225-1** through **225-N**, interconnected as shown. As can be seen by comparing FIG. 3 with FIG. 2, wireline telephone **110-i** is similar to cordless telephone **130**, with the exception that wireline telephone **110-i** does not have geo-location sensors **240**, which are superfluous in a wireline terminal at a fixed position.

[0025] FIG. 4 depicts a block diagram of the salient components of wireless telephone **160**, in accordance with the illustrative embodiment of the present invention. Wireline telephone **110-i** comprises: receiver **210**, processor **220**, clock **230**, geo-location sensors **240**, environmental sensors **250**, physiological sensors **260**, and transducers **225-1** through **225-N**, interconnected as shown. As can be seen by comparing FIG. 4 with FIG. 2, wireless terminal **160** is similar to wireless terminal **130**. It will also be clear to those of ordinary skill in the art how to apply the architecture of FIG. 4 to other wireless terminals such as two-way pagers, personal digital assistants (PDAs), etc.

[0026] FIG. 5 depicts a block diagram of the salient components of geo-location sensors **240**, in accordance with the illustrative embodiment of the present invention. Geo-

location sensors **240** comprises: global positioning system (GPS) **510**, altimeter **520**, and accelerometer **530**.

[0027] GPS **510** receives satellite-based signals and determines global position, as is well understood in the art, and transmits the data to processor **220**. In some embodiments, GPS **510** also transmits information to processor **220** concerning the geo-locations of other wireless terminals in the vicinity; as described below, processor **220** can consider this information in determining how to alert the user to the arrival of the incoming message.

[0028] It will be clear to persons skilled in the art that some embodiments might employ means other than satellite-based signals for determining geo-location (e.g., triangulation, radio beacons, radio-frequency fingerprinting [U.S. Pat. No. 6,393,294, incorporated by reference], etc.) In such embodiments, an appropriate receiver (e.g., radio-frequency receiver, etc.) would be substituted for GPS **510**, as is well understood in the art.

[0029] Altimeter **520** measures altitude, in well-known fashion, and transmits its measurements to processor **220**; in some embodiments altimeter **520**'s readings are based on barometric pressure, and in some other embodiments altimeter **520** is radar-based.

[0030] Accelerometer **530** measures acceleration, in well-known fashion, and transmits its measurements to processor **220**.

[0031] FIG. 6 depicts a block diagram of the salient components of environmental sensors **250**, in accordance with the illustrative embodiment of the present invention. Environmental sensors **250** comprises: thermometer **610**, hygrometer **620**, barometer **630**, sound level meter **640**, and photometer **650**, all of which receive information from the atmosphere.

[0032] Thermometer **610** measures ambient temperature, in well-known fashion, and transmits its measurements to processor **220**.

[0033] Hygrometer **620** measures ambient humidity, in well-known fashion, and transmits its measurements to processor **220**.

[0034] Barometer **630** measures ambient air pressure, in well-known fashion, and transmits its measurements to processor **220**.

[0035] Sound level meter **640** measures ambient sound intensity, in well-known fashion, and transmits its measurements to processor **220**.

[0036] Photometer **650** measures ambient light intensity, in well-known fashion, and transmits its measurements to processor **220**.

[0037] FIG. 7 depicts a block diagram of the salient components of physiological sensors **260**, in accordance with the illustrative embodiment of the present invention. Physiological sensors **260** comprises: heart rate monitor **710**, blood pressure monitor **720**, respiration rate monitor **730**, body temperature monitor **740**, and brain activity monitor **750**. In some embodiments, at least one of these monitors receives input from the user via at least one sensor coupled to a part of a user's body (e.g., finger, forehead, etc.), wherein the sensor transmits data to the terminal either by a wire, or wirelessly. In some other embodiments, at least

one of these monitors receives input from the user via at least one sensor located within the terminal, wherein the sensor receives physiological signals from the user when the user is holding the terminal.

[0038] Heart rate monitor **710** measures the user's heart rate, in well-known fashion, and transmits its measurements to processor **220**.

[0039] Blood pressure monitor **720** measures the user's blood pressure, in well-known fashion, and transmits its measurements to processor **220**.

[0040] Respiration rate monitor **730** measures the user's respiration rate, in well-known fashion, and transmits its measurements to processor **220**.

[0041] Body temperature monitor **740** measures the user's body temperature, in well-known fashion, and transmits its measurements to processor **220**.

[0042] Brain activity monitor **750** measures the user's brain activity in well-known fashion (e.g., EKG, etc.), and transmits its measurements to processor **220**.

[0043] FIG. 8 depicts a flowchart of the operation of processor **220** according to the present invention.

[0044] At task **810**, processor **220** receives an incoming message from a remote user.

[0045] At task **815**, processor **220** considers one or more properties of the incoming message for determining how to alert the user to the arrival of the incoming message. In some embodiments such properties can include: the sender of the message, properties of the sender (e.g., the caller's gender, age, etc.), a priority associated with the message, the semantic content of the subject and/or body of the message, the length of the message, etc.

[0046] At task **820**, processor **220** notes whether receiver **210** is currently receiving another message, and if so, what type of message (e.g., voice, email, etc.), for determining how to alert the user to the arrival of the incoming message.

[0047] At task **825**, processor **220** considers data received from clock **230** for determining how to alert the user to the arrival of the incoming message.

[0048] At task **830**, processor **220** considers data received from geo-location sensors **240** for determining how to alert the user to the arrival of the incoming message. As indicated above, these data can indicate the most appropriate manner in which a user should be alerted to an incoming message; for example, it might be advantageous to alert a user inside a church or movie theater via a vibration transducer (the theory being that there are some places where an acoustic alert would disturb others.)

[0049] At task **835**, processor **220** considers data received from environmental sensors **250** for determining how to alert the user to the arrival of the incoming message; for example, it might be advantageous to alert a user via a vibration transducer in a noisy environment (the theory being that the user might not hear the alert.)

[0050] At task **840**, processor **220** considers data received from physiological sensors **260** for determining how to alert the user to the arrival of the incoming message; for example, it might be advantageous to alert a user via an acoustic transducer when a user is sleeping (the theory being that

either (a) the user might not have the phone on his/her person, or (b) if the user does have the phone on his/her person, the vibration may not be sufficient to awaken the user.)

[0051] At task **845**, processor **220** decides, based on (i) how its user has programmed it; (ii) properties of the incoming message; (iii) whether receiver **210** is currently receiving another message, and if so, what type of message; and (iv) the data from clock **230**, geo-location sensors **240**, environmental sensors **250**, and physiological sensors **260**; which of the incoming message's properties and/or portions of information content should be communicated via an alert (e.g., the "subject" field of an email message, the length of the message, the priority of the message, etc.)

[0052] At task **850**, processor **220** decides, again based on (i) how its user has programmed it; (ii) properties of the incoming message; (iii) whether receiver **210** is currently receiving another message, and if so, what type of message; and (iv) the data from clock **230**, geo-location sensors **240**, environmental sensors **250**, and physiological sensors **260**; which transducer(s) **225-1** through **225-N** should alert the user to the arrival of the incoming message.

[0053] At task **855**, transducer(s) **255** selected in task **850** generate output signal(s) containing the information selected in task **845**. It will be clear to those skilled in the art how to generate such output signals; for example, an acoustic transducer could generate a musical signal or a human-like voice to alert the user, while a visual transducer could generate text or graphic symbols to alert the user, as is well understood in the art.

[0054] It is to be understood that the above-described embodiments are merely illustrative of the present invention and that many variations of the above-described embodiments can be devised by those skilled in the art without departing from the scope of the invention. It is therefore intended that such variations be included within the scope of the following claims and their equivalents.

What is claimed is:

1. An apparatus comprising:

a receiver for receiving an incoming signal directed to a telecommunications terminal, wherein said incoming signal is characterized by at least one property;

a plurality of transducers, wherein each of said transducers can alert a user to the arrival of said incoming signal; and

a processor for selecting which of said transducers alert said user based on at least one property of said incoming signal.

2. The apparatus of claim 1 wherein at least one of said properties is said incoming signal's sender.

3. The apparatus of claim 1 wherein at least one of said properties is said incoming signal's semantic content.

4. The apparatus of claim 1 wherein said processor's selecting is also based on at least one of:

whether said receiver is receiving another signal, and

how said receiver is receiving said other signal.

5. The apparatus of claim 1 wherein at least one of said transducers generates an acoustic output signal.

6. The apparatus of claim 1 wherein at least one of said transducers generates a visual output signal.

7. An apparatus comprising:

a receiver for receiving an incoming signal directed to a telecommunications terminal, wherein said incoming signal comprises a plurality of sub-signals and is characterized by at least one property;

a processor for selecting at least one of said sub-signals based on at least one of said properties; and

a transducer for generating an output signal based on said selected sub-signals to alert a user to the arrival of said incoming signal.

8. The apparatus of claim 7 wherein at least one of said properties is said incoming signal's sender.

9. The apparatus of claim 7 wherein at least one of said properties is said incoming signal's semantic content.

10. The apparatus of claim 7 wherein at least one of said properties is the quantity of information contained in said incoming signal.

11. The apparatus of claim 7 wherein at least one of said sub-signals is a message subject.

12. The apparatus of claim 7 wherein said processor's selecting is also based on at least one of:

whether said receiver is receiving another signal, and

how said receiver is receiving said other signal.

13. An apparatus comprising:

a receiver for receiving an incoming signal directed to a telecommunications terminal;

a plurality of transducers, wherein each of said transducers can alert a user to the arrival of said incoming signal; and

a processor for selecting which of said transducers alert said user based on at least one of:

the calendrical time at said telecommunications terminal,

the geo-location of said telecommunications terminal, a change in the geo-location of said telecommunications terminal,

the proximity of said geo-location to another person, said incoming signal's relevance to said other person an environmental property,

a change in said environmental property,

a physiological property of said user, and

a change in said physiological property of said user.

14. The apparatus of claim 13 wherein said environmental property is selected from the group consisting of: temperature, humidity, air pressure, ambient noise level, and ambient luminosity.

15. The apparatus of claim 13 wherein said physiological property is selected from the group consisting of: heart rate, blood pressure, respiration rate, body temperature, and brain activity.

16. The apparatus of claim 13 wherein said processor's selecting is also based on at least one of:

whether said receiver is receiving another signal, and

how said receiver is receiving said other signal.

17. An apparatus comprising:

a receiver for receiving an incoming signal directed to a telecommunications terminal, wherein said incoming signal comprises a plurality of sub-signals;

a processor for selecting at least one of said sub-signals based on at least one of:

the calendrical time at said telecommunications terminal,

the geo-location of said telecommunications terminal, a change in the geo-location of said telecommunications terminal,

the proximity of said geo-location to another person, said incoming signal's relevance to said other person an environmental property,

a change in said environmental property,

a physiological property of said user, and

a change in said physiological property of said user.

18. The apparatus of claim 17 wherein said environmental property is selected from the group consisting of: temperature, humidity, air pressure, ambient noise level, and ambient luminosity.

19. The apparatus of claim 17 wherein said physiological property is selected from the group consisting of: heart rate, blood pressure, respiration rate, body temperature, and brain activity.

20. The apparatus of claim 17 wherein said processor's selecting is also based on at least one of:

whether said receiver is receiving another signal, and

how said receiver is receiving said other signal.

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专利名称(译)	智能多模消息警报		
公开(公告)号	<a href="#">US20040066932A1</a>	公开(公告)日	2004-04-08
申请号	US10/263616	申请日	2002-10-03
[标]申请(专利权)人(译)	塞里格曼DOREE邓肯		
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当前申请(专利权)人(译)	塞里格曼DOREE邓肯		
[标]发明人	SELIGMANN DOREE DUNCAN		
发明人	SELIGMANN, DOREE DUNCAN		
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优先权	60/380140 2002-05-06 US		
其他公开文献	US7142664		
外部链接	<a href="#">Espacenet</a> <a href="#">USPTO</a>		

摘要(译)

公开了一种智能地确定如何警告用户在电信终端处到达传入消息以及通过警报向用户传达什么信息的装置。在说明性实施例中，终端具有处理器，该处理器基于以下中的一个或多个来做出该确定：传入消息的属性（例如，发送消息的人，与消息相关联的优先级，消息的语义内容），消息的长度等），时间和日期（即“日历时间”），环境参数（例如，温度，环境光度等），用户的生理参数（例如，血压，心脏）速率等），用户的位置，附近其他无线终端的接近度，用户当前是否正在接收另一消息，以及其他消息的传递机制（例如，语音，文本聊天等）。

