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(54) **TERMINAL, METHOD AND COMPUTER PROGRAM PRODUCT FOR INTERACTING WITH A SIGNALING TAG**

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G06Q 30/02	(2012.01)
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H04W 8/24	(2009.01)
H04W 48/08	(2009.01)

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CPC ***H04M 1/72412*** (2021.01); ***G06Q 20/203*** (2013.01); ***G06Q 30/0283*** (2013.01); ***H04W 4/80*** (2018.02); ***H04W 76/14*** (2018.02); *H04M 1/7243* (2021.01); *H04M 1/72445* (2021.01); *H04W 8/24* (2013.01); *H04W 48/08* (2013.01); *H04W 48/16* (2013.01); *H04W 88/06* (2013.01)

(58) **Field of Classification Search**

CPC G06Q 30/0283; G06Q 20/203; H04W 76/14; H04W 88/06; H04M 1/7253; H04M 1/72547; H04M 1/72561

See application file for complete search history.

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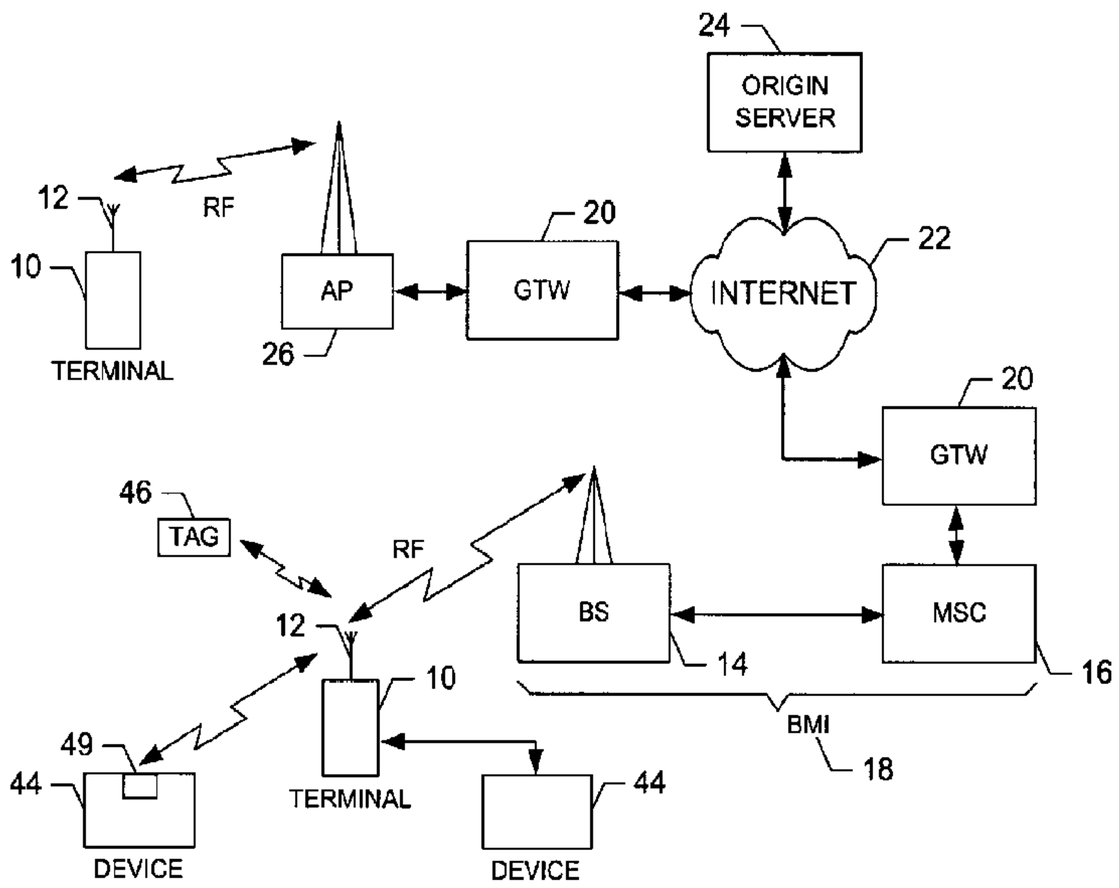
(57) **ABSTRACT**

A terminal for interacting with a signaling tag includes a controller capable of receiving information regarding a signaling tag at least partially over an air interface. The controller is also capable of determining whether the controller is actively operating an application. In this regard, if the terminal is actively operating an application, the controller is capable of performing a predefined action based upon the application and a state of the application.

41 Claims, 5 Drawing Sheets



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H04W 48/16 (2009.01)
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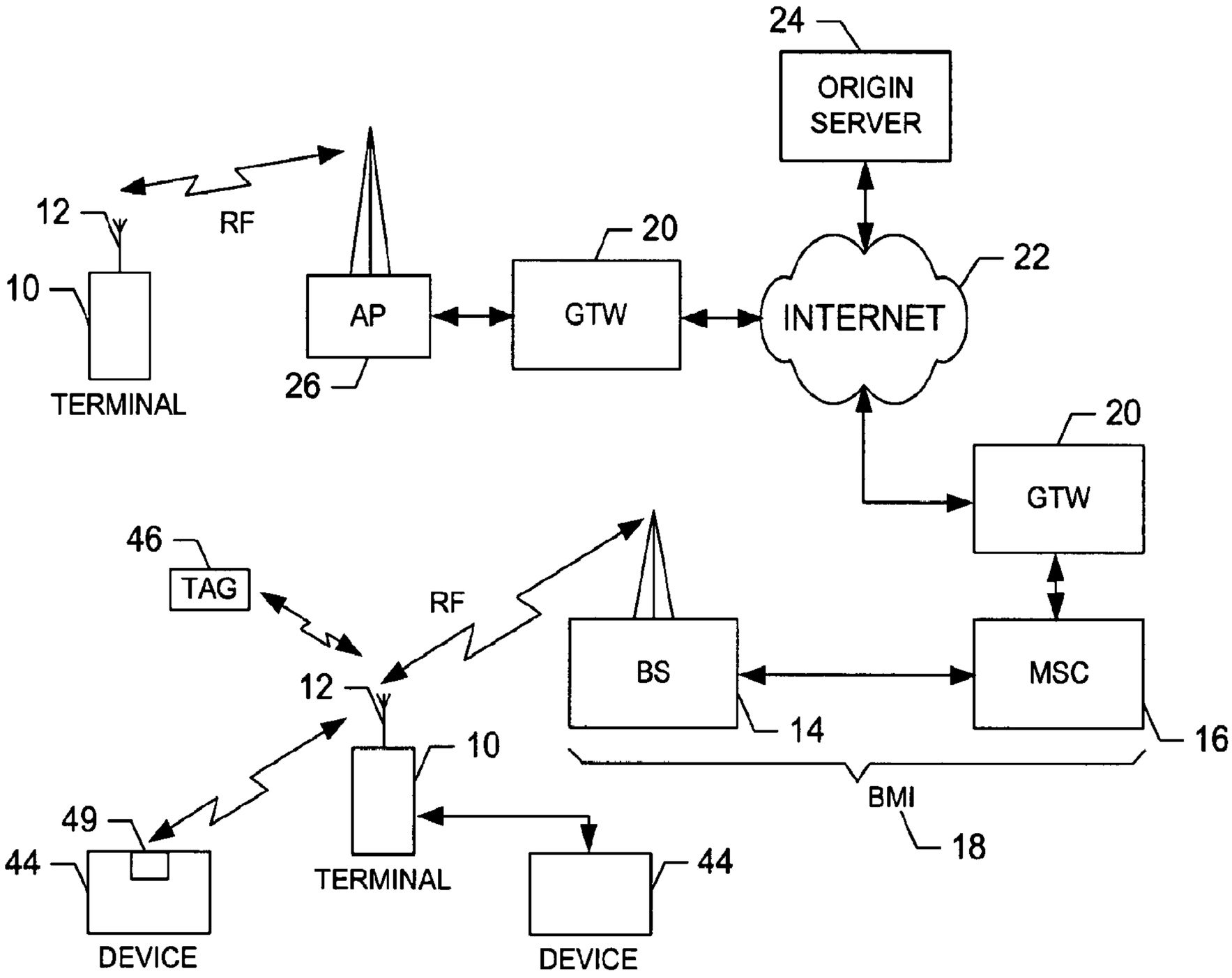
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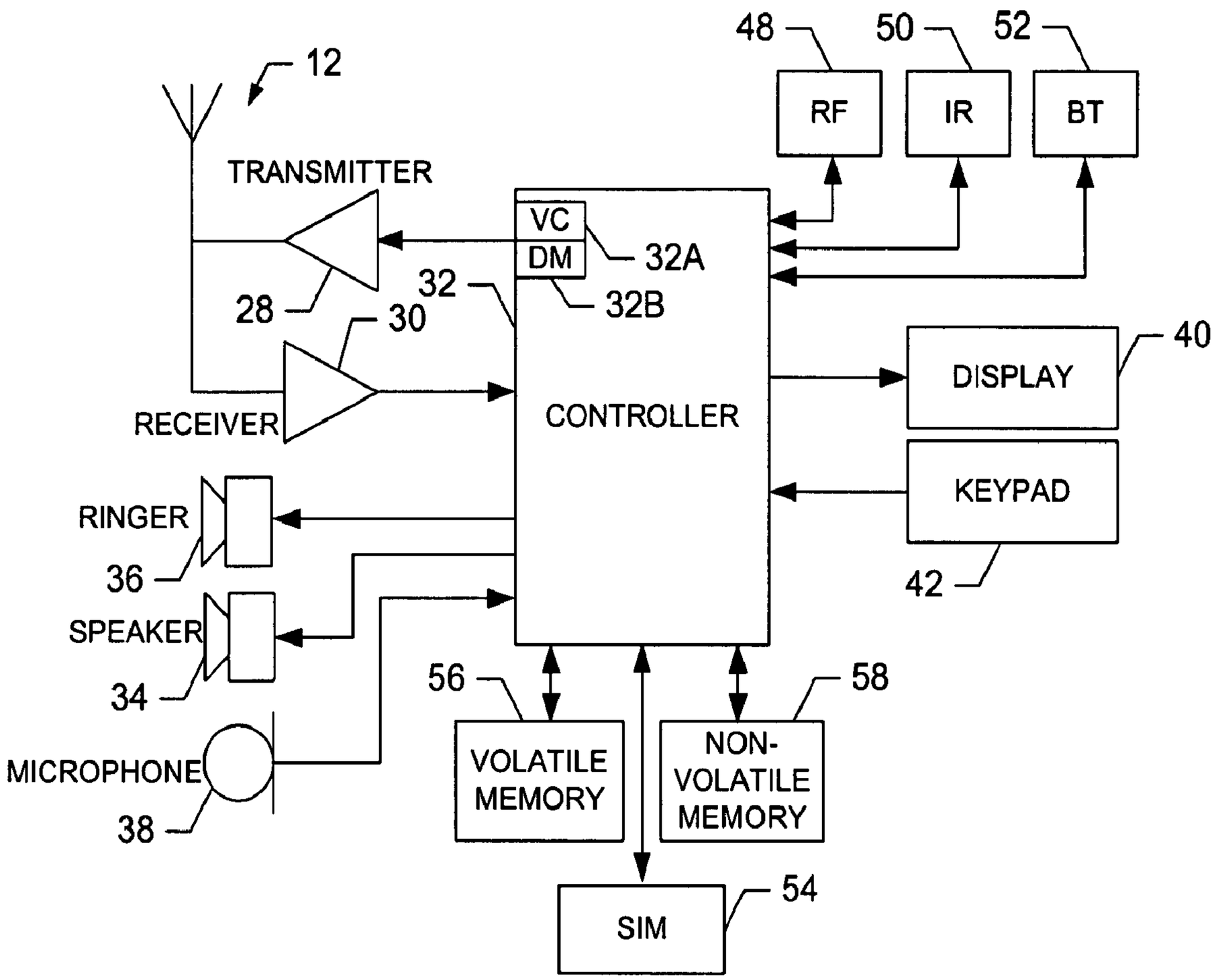
ORIGIN SERVER
12
RF
10
TERMINAL
AP
26
20
GTW
22
INTERNET
20
GTW
46
TAG
RF
12
10
BS
14
MSC
16
BMI
18
49
44
TERMINAL
44
DEVICE
DEVICE

FIG. 1.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TRANSMITTER
28
30
RECEIVER
32
VC
DM
32A
32B
CONTROLLER
48
50
52
RF
IR
BT
DISPLAY
40
KEYPAD
42
RINGER
36
SPEAKER
34
MICROPHONE
38
56
VOLATILE MEMORY
58
NON-VOLATILE MEMORY
SIM
54

FIG. 2.

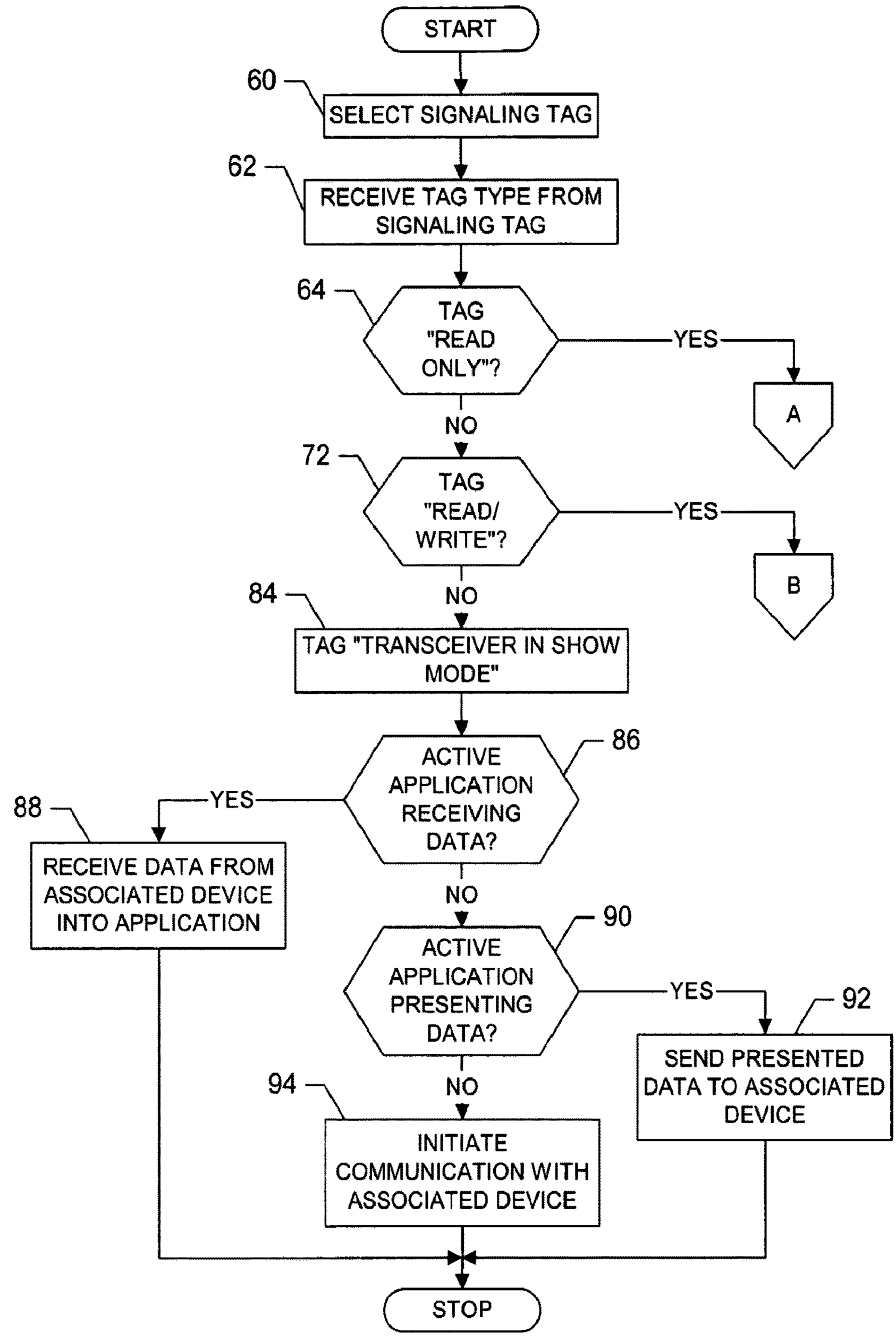
START
60
SELECT SIGNALING TAG
62
RECEIVE TAG TYPE FROM SIGNALING TAG
64
TAG "READ ONLY"?
YES
A
NO
72
TAG "READ/ WRITE"?
YES
B
NO
84
TAG "TRANSCEIVER IN SHOW MODE"
86
ACTIVE APPLICATION RECEIVING DATA?
YES
88
RECEIVE DATA FROM ASSOCIATED DEVICE INTO APPLICATION
NO
90
ACTIVE APPLICATION PRESENTING DATA?
YES
92
SEND PRESENTED DATA TO ASSOCIATED DEVICE
NO
94
INITIATE COMMUNICATION WITH ASSOCIATED DEVICE
STOP

FIG. 3A.

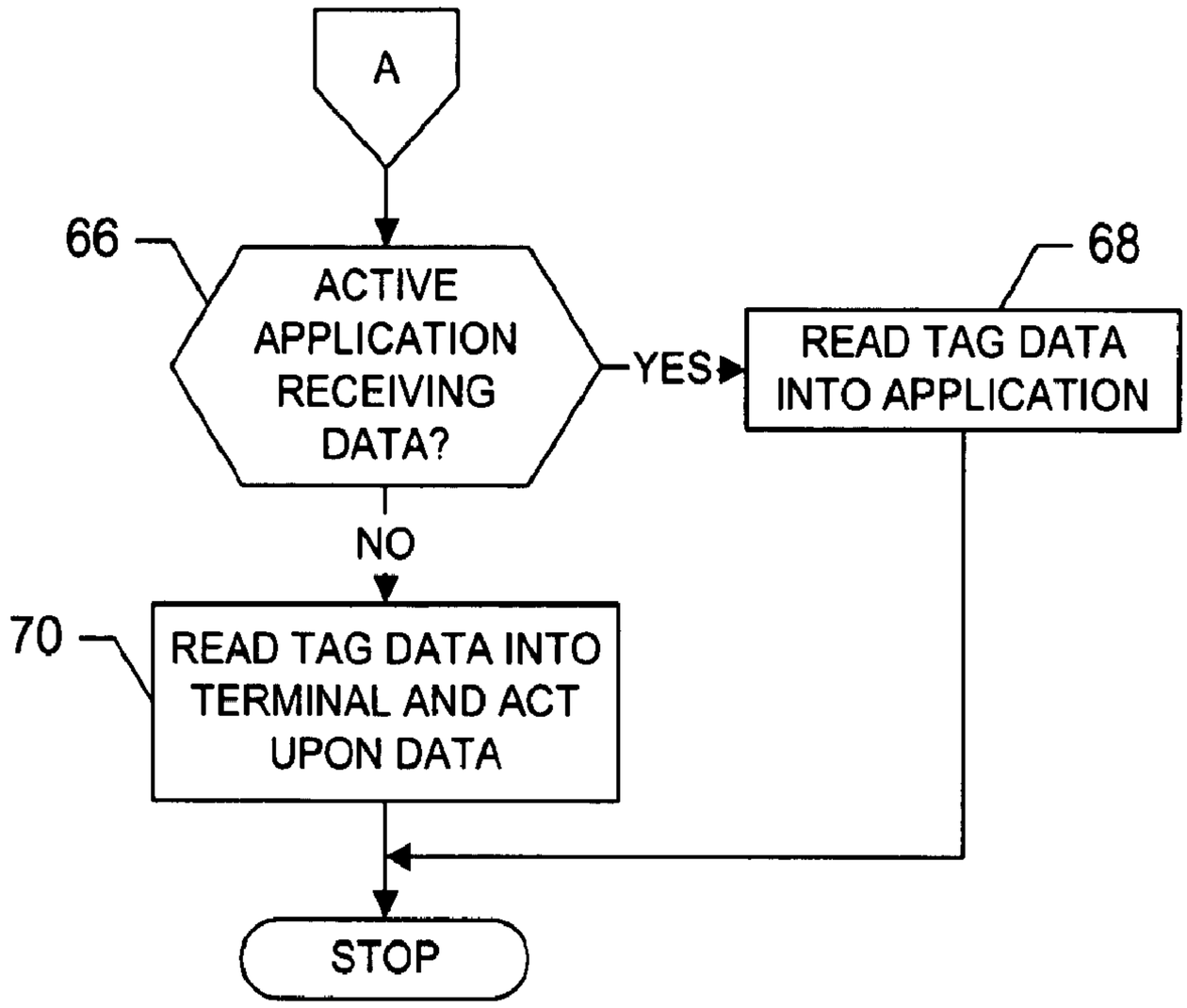
A
66
ACTIVE APPLICATION RECEIVING DATA?
YES
68
READ TAG DATA INTO APPLICATION
NO
70
READ TAG DATA INTO TERMINAL AND ACT UPON DATA
STOP

FIG. 3B.

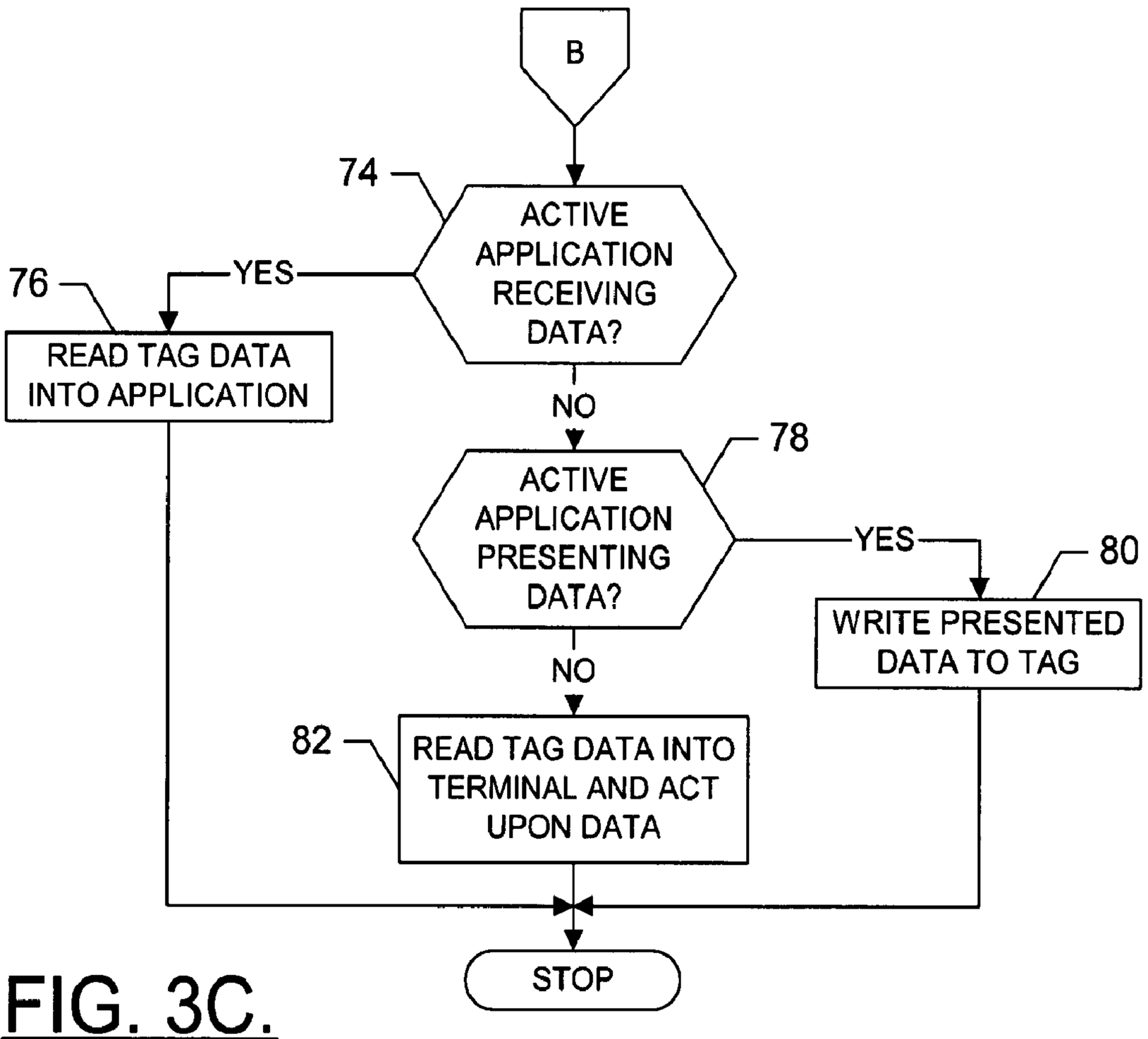
B
74
ACTIVE APPLICATION RECEIVING DATA?
YES
76
READ TAG DATA INTO APPLICATION
NO
78
ACTIVE APPLICATION PRESENTING DATA?
YES
80
WRITE PRESENTED DATA TO TAG
NO
82
READ TAG DATA INTO TERMINAL AND ACT UPON DATA
STOP

FIG. 3C.

NEW SHEET

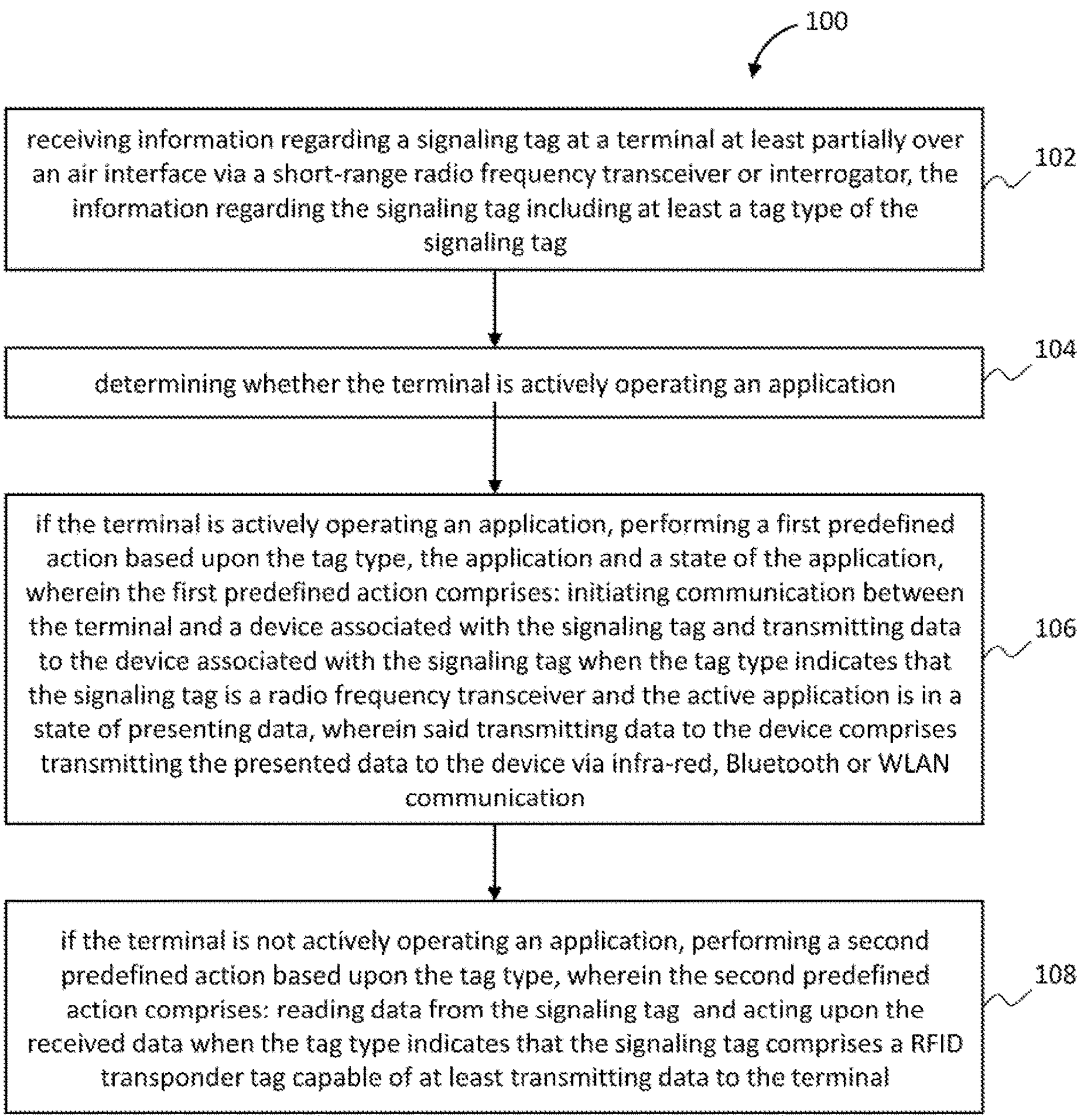

FIG. 4

TERMINAL, METHOD AND COMPUTER PROGRAM PRODUCT FOR INTERACTING WITH A SIGNALING TAG

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates the additions made by reissue; a claim printed with strikethrough indicates that the claim was canceled, disclaimed, or held invalid by a prior post-patent action or proceeding.

CROSS REFERENCE TO RELATED APPLICATIONS

This application is a reissue of U.S. Pat. No. 7,775,432, titled "Terminal, Method and Computer Program Product for Interacting with a Signaling Tag," issued Aug. 17, 2010, which is hereby incorporated by reference herein in its entirety.

FIELD OF THE INVENTION

The present invention generally relates to systems and methods of interacting with entities and, more particularly, relates to terminals, methods and computer program products for interacting in a short-range environment to perform actions based on applications capable of operating on the terminal.

BACKGROUND OF THE INVENTION

Computer science researchers have been exploring ideas associated with "smart spaces" or ubiquitous computing for years. One of the most important challenges has been creating new, intuitive user interfaces that are suitable for ubiquitous computing applications, but are not based on traditional personal computing platforms. The challenge is to make these new devices and applications simple and intuitive to use. Donald Norman describes some of the challenges in designing such a user interface in the book, THE INVISIBLE COMPUTER.

In an attempt to address the design challenges of user interfaces suitable for ubiquitous computing applications, there has been significant work in the area of point-and-click user interfaces and the application of point-and-click ideas to ubiquitous computing research. Traditional infrared (IR) remote controls are an obvious example. In this regard, IR remote controls are being developed today to allow users to control a number of different entities from a single controller. Another example of the application of point-and-click ideas to ubiquitous computing research is the "Cooltown" research project within Hewlett-Packard Laboratories. Generally, in accordance with the Cooltown research project, users can interact with entities using wireless communication devices to execute uniform resource locators (URLs) to web resources such that the wireless communication device can thereafter interact with the web resources.

Whereas previous real-world point-and-click techniques allow users to interact with entities in a predetermined manner, such as to control the entity or link to web resources, such techniques are inflexible. In this regard, most systems employing such techniques are single purpose devices. For example. Cooltown uses wireless communication devices to achieve limited, multi-application, point and click functionality. Cooltown protocols are used to send and receive URLs and these URLs are assumed to point to

HTML documents. Cooltown can be thought of as a sort of real-world, web browsing system. The flexibility of this approach is limited, however, because it is based on URLs that only point to web resources.

SUMMARY OF THE INVENTION

In light of the foregoing background, embodiments of the present invention provide an improved terminal, method and computer program product for interacting with signaling tags, such as Radio Frequency Identification (RFID) transponder tags, radio frequency transponders operating as RFID transponder tags, or the like. Embodiments of the present invention create a "point-and-click" style of user interface for ubiquitous computing applications that is based on the use of a terminal, such as a mobile station or portable digital assistant (PDA). Generally, embodiments of the present invention permit terminal users to use a terminal to select electronic tags from which the terminal can read data and/or to which the terminal can write data. Based upon a tag type indicating the tag as being capable of transmitting and/or receiving data, the terminal can perform predefined actions. Advantageously, the terminal can be capable of actively operating an application, such as a software application, and as such, the terminal can be capable of performing the predefined action further based upon the application and the state of the application, such as being in a state of receiving or presenting data.

As indicated above, a signaling tag can comprise a transceiver capable of operating as an electronic tag, where the transceiver is associated with an electronic device. In such instances, the terminal can perform predefined actions such as by reading data from and/or writing data to the electronic device associated with the transceiver. Instead of reading data from and/or writing data to the associated device via the transceiver, the terminal can advantageously be capable of reading data from and/or writing data to the associated device in a manner independent of the transceiver. For example, when the transceiver comprises a radio frequency transceiver, the terminal can be capable of reading data from and/or writing data to the associated device in a manner such as in accordance with infrared, Bluetooth, or any of a number of different wireless networking techniques, including WLAN techniques.

According to one aspect of the present invention. a terminal is provided for interacting with a signaling tag. The terminal includes a controller capable of receiving information regarding a signaling tag, such as a Radio Frequency Identification (RFID) transponder tag, at least partially over an air interface. The controller is also capable of determining whether the terminal is actively operating an application. In this regard, if the terminal is actively operating an application, the controller is capable of performing a predefined action based upon the application and the state of the application. More particularly, the controller can be capable of reading data from the signaling tag into an actively operating application when (a) the information regarding the signaling tag indicates that the signaling tag is capable of at least transmitting data to the terminal (e.g., tag types "Read Only," "Read/Write"), (b) the controller is actively operating an application. and (c) the application is in a state of receiving data.

The controller can be further capable of selecting a signaling tag before receiving information regarding the signaling tag. In such instances, the signaling tag can comprise a RFID transponder tag. In this regard, the terminal can also include a transceiver such that the controller is

capable of selecting a signaling tag by the transceiver being passed within a predefined distance of a signaling tag. After selecting the signaling tag, the controller can then be capable of receiving the information regarding the signaling tag. For example, the controller can be capable of sending an interrogation signal to the RFID transponder tag. In response to the interrogation signal, then, the terminal can receive information regarding a signaling tag comprising a tag type. Alternatively for example, the terminal can be capable of sending at least one interrogation signal to the RFID transponder tag, where each interrogation signal is associated with a different tag type. The terminal can receive a response from the RFID transponder tag to one of the interrogation signal(s) that triggers the response. Then, the terminal can be capable of identifying a tag type based upon the interrogation signal that triggers the response, where the information regarding a signaling tag comprises the identified tag type.

Irrespective of how the terminal receives the information regarding the signaling tag, when the information regarding the signaling tag indicates that the signaling tag is capable of at least transmitting data to the terminal (e.g., tag types "Read Only," "Read/Write") and either (a) the controller is not actively operating an application, or (b) the controller is actively operating an application in a state other than a state of receiving data, the controller can be capable of reading data from the signaling tag into the terminal, such as to store the data into the terminal. The controller can be capable of writing data to the signaling tag when (a) the information regarding the signaling tag indicates that the signaling tag is capable of at least receiving data from the terminal (e.g., tag type "Read/Write"), (b) the controller is actively operating an application, and (c) the application is in a state of presenting data. However, when the information regarding the signaling tag indicates that the signaling tag is capable of at least transmitting data to the terminal (e.g., tag type "Read/Write") and either (a) the controller is not actively operating an application, or (b) the controller is actively operating an application in a state other than a state of one of receiving data and presenting data, the controller can be capable of reading data from the signaling tag into the terminal.

In various instances, the signaling tag comprises a transceiver capable of operating as an electronic tag, such as an RFID transponder tag, where the transceiver is associated with a device. In such instances, when (a) the information regarding the signaling tag indicates that the transceiver is capable of at least transmitting data, (b) the controller is actively operating an application, and (c) the application is in a state of receiving data, the controller can be capable of reading data from a device associated with a transceiver into the actively operating application. The controller can be capable of writing data to the device associated with the transceiver when (a) the information regarding the signaling tag indicates that the transceiver is capable of at least receiving data, (b) the controller is actively operating an application, and (c) the application is in a state of presenting data. Advantageously, the controller can be capable of reading data from and/or writing data to the device in a manner independent of the transceiver. In such instances, the controller can be capable of receiving at least one connection parameter from the device via the transceiver, and thereafter reading data from and/or writing data to the device based upon the connection parameter(s) and in a manner independent of the transceiver.

In instances in which the information regarding the signaling tag indicates that the transceiver is capable of at least transmitting data and either (a) the controller is not actively operating an application, or (b) the controller is actively operating an application in a state other than a state of one of receiving data and presenting data, the controller can be capable of initiating communication with the device associated with the transceiver. Advantageously, in a manner similar to reading data from and/or writing data to the device, the controller can be capable of initiating communication with the device in a manner independent of the transceiver.

A method and computer program product for interacting with a signaling tag are also provided. Embodiments of the present invention therefore provide a terminal, method and computer program product for interacting with signaling tags, such as RFID transponder tags and/or radio frequency transceivers. In contrast to conventional computing systems, embodiments of the present invention allow the terminal to perform different predefined actions, such as reading data to and/or writing data from the signaling tag or a device associated with a signaling tag comprising a transceiver, by selecting different signaling tags. As such, the terminal, method and computer program product of embodiments of the present invention solve the problems identified by prior techniques and provide additional advantages.

BRIEF DESCRIPTION OF THE DRAWINGS

Having thus described the invention in general terms, reference will now be made to the accompanying drawings, which are not necessarily drawn to scale, and wherein:

FIG. **1** is a block diagram of one type of terminal and system that would benefit from embodiments of the present invention;

FIG. **2** is a schematic block diagram of a terminal comprising a mobile station, in accordance with one embodiment of the present invention; and

FIGS. **3**A-C are flowcharts illustrating various steps in a method of interacting with a signaling tag in accordance with one embodiment of the present invention.

FIG. 4 is a flowchart illustrating various steps in a method of interacting with a signaling tag in accordance with one embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

The present invention now will be described more fully hereinafter with reference to the accompanying drawings, in which preferred embodiments of the invention are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art. Like numbers refer to like elements throughout.

Referring to FIG. **1**. an illustration of one type of terminal and system that would benefit from embodiments of the present invention is provided. The system, terminal and method of embodiments of the present invention will be primarily described in conjunction with mobile communications applications. It should be understood, however, that the system and method of the present invention can be utilized in conjunction with a variety of other applications, both in the mobile communications industries and outside of the mobile communications industries. For example, the

system and method of the present invention can be utilized in conjunction with wireline and/or wireless network (e.g., Internet) applications.

As shown, a terminal **10** may include an antenna **12** for transmitting signals to and for receiving signals from a base site or base station (BS) **14**. The base station is a part of a cellular network that includes elements required to operate the network, such as a mobile switching center (MSC) **16**. As well known to those skilled in the art, the cellular network may also be referred to as a Base Station/MSC/Interworking function (BMI) **18**. In operation, the MSC is capable of routing calls and messages to and from the terminal when the terminal is making and receiving calls. The MSC also provides a connection to landline trunks when the terminal is involved in a call. Further, the MSC can, but need not, be coupled to a server GTW **20** (Gateway).

The MSC **16** can be coupled to a network, such as a local area network (LAN), a metropolitan area network (MAN), and/or a wide area network (WAN). The MSC can be coupled to the network directly, or if the system includes a GTW **20** (as shown), the MSC can be coupled to the network via the GTW. In one typical embodiment, for example, the MSC is coupled to the GTW, and the GTW is coupled to a WAN, such as the Internet **22**. In turn, devices such as processing elements (e.g., personal computers, server computers or the like) can be coupled to the terminal **10** via the Internet. For example, the processing elements can include one or more processing elements associated with an origin server **24**. Additionally, the network may be coupled to one or more wireless access points (APs) **26**, which may be wirelessly coupled to one or more terminals **10**. By directly or indirectly connecting the terminals and the other devices (e.g., origin server) to the Internet, the terminals can communicate with the other devices and with one another, such as according to the Hypertext Transfer Protocol (HTTP), to thereby carry out various functions of the terminal.

Reference is now made to FIG. **2**, which illustrates one type of terminal **10**, a mobile station, that would benefit from embodiments of the present invention. It should be understood, however, that the mobile station illustrated and hereinafter described is merely illustrative of one type of terminal that would benefit from the present invention and, therefore, should not be taken to limit the scope of the present invention. While several embodiments of the terminal are illustrated and will be hereinafter described for purposes of example, other types of terminals, such as portable digital assistants (PDAs), pagers, laptop computers and other types of electronic systems, can readily employ the present invention.

As shown, in addition to an antenna **12**, the mobile station includes a transmitter **28**, a receiver **30**, and a controller **32** that provides signals to and receives signals from the transmitter and receiver, respectively. These signals include signaling information in accordance with the air interface standard of the applicable cellular system, and also user speech and/or user generated data. In this regard, the mobile station can be capable of operating with one or more air interface standards, communication protocols, modulation types, and access types. More particularly, the mobile station can be capable of operating in accordance with any of a number of first generation (1G), second generation (2G), 2.5G and/or third-generation (3G) communication protocols or the like. For example, the mobile station may be capable of operating in accordance with 2G wireless communication protocols IS-136 (TDMA), GSM, and IS-95 (CDMA). Some narrow-band AMPS (NAMPS), as well as TACS, mobile terminals may also benefit from the teaching of thi s invention, as should dual or higher mode phones (e.g., digital/analog or TDMA/CDMA/analog phones).

It is understood that the controller **32** includes the circuitry required for implementing the audio and logic functions of the mobile station. For example. the controller may be comprised of a digital signal processor device, a microprocessor device, and various analog-to-digital converters, digital-to-analog converters, and other support circuits. The control and signal processing functions of the mobile station are allocated between these devices according to their respective capabilities. The controller can additionally include an internal voice coder (VC) **32**A, and may include an internal data modem (DM) **32**B. Further. the controller may include the functionally to operate one or more software programs, which may be stored in memory (described below). For example, the controller may be capable of operating a connectivity program, such as a conventional Web browser. The connectivity program may then allow the mobile station to transmit and receive Web content, such as according to the Hypertext Transfer Protocol (HTTP) and/or the Wireless Application Protocol (WAP), for example.

The mobile station also comprises a user interface including a conventional earphone or speaker **34**, a ringer **36**, a microphone **38**, a display **40**, and a user input interface, all of which are coupled to the controller **32**. The user input interface. which allows the mobile station to receive data, can comprise any of a number of devices allowing the mobile station to receive data, such as a keypad **42**, a touch display (not shown) or other input device. In embodiments including a keypad, the keypad includes the conventional numeric (0-9) and related keys (#, *), and other keys used for operating the mobile station. Although not shown, the mobile station can include a battery, such as a vibrating battery pack, for powering the various circuits that are required to operate the mobile station, as well as optionally providing mechanical vibration as a detectable output.

The mobile station can also include one or more means for sharing and/or obtaining data from electronic devices **44**, tags **46** or the like. As will be appreciated, the electronic devices and tags can comprise any of a number of different known devices and tags capable of transmitting and/or receiving data in accordance with any of a number of different wireline and/or wireless techniques. For example, the electronic devices can comprise any of a number of different terminals **10**, including other mobile stations, portable digital assistants (PDAs), pagers, laptop computers and other types of electronic systems. Likewise, for example, the tags can comprise Radio Frequency Identification (RFID) transponder tags or the like.

As shown in FIG. **2**, the mobile station can include a short-range radio frequency (RF) transceiver or interrogator **48** so that data can be shared with and/or obtained from electronic devices **44** including other radio frequency transceivers (shown as **49** in FIG. **1**), and/or RFID transponder tags **46**. According to one embodiment of the present invention, the interrogator communicates with the tags by sending out an RF signal, which "wakes up" a transponder tag within the coverage. and the tag then transmits a signal back to the interrogator via an RF frequency signal. For more information on RFID wireless network principles, see Automatic Identification Manufacturers (AIM), Radio Frequency, Identification: A Basic Primer, (2001), available at <http://http://www.aimglobal.org/technologies/rfid>, the contents of which are hereby incorporated by reference in its entirety. The mobile station can additionally, or alternatively, include other short-range transceivers, such as, for example an

infrared (IR) transceiver **50**, and/or a Bluetooth (BT) transceiver **52** operating using Bluetooth brand wireless technology developed by the Bluetooth Special Interest Group. The mobile station can therefore additionally or alternatively be capable of transmitting data to and/or receiving data from electronic devices and/or tags in accordance with such techpiques. Although not shown, the mobile station can additionally or alternatively be capable of transmitting and/or receiving data from electronic devices and/or tags according to a number of different wireless networking techniques, including WLAN techniques such as IEEE 802.11 techniques or the like. Further, the mobile station can additionally or alternatively include a tag, such as an RFID transponder tag. For example, the mobile station can include a tag **46** capable of transmitting and/or receiving data in accordance with any of a number of different wireline and/or wireless techniques in accordance with embodiments of the present invention.

The mobile station can further include memory, such as a subscriber identity module (SIM) **54**, a removable user identity module (R-UIM) or the like, which typically stores information elements related to a mobile subscriber. In addition to the SIM, the mobile station can include other removable and/or fixed memory. In this regard, the mobile station can include volatile memory **56**, such as volatile Random Access Memory (RAM) including a cache area for the temporary storage of data. The mobile station can also include other non-volatile memory **58**. which can be embedded and/or may be removable. The non-volatile memory can additionally or alternatively comprise an EEPROM, flash memory or the like. The memories can store any of a number of pieces of information, and data, used by the mobile station to implement the functions of the mobile station. The memories can also store one or more applications capable of operating on the mobile station.

The applications capable of operating on the mobile station can comprise any of a number of different applications capable of being executed by the controller **32**. For example, the applications can include a printing application capable of directing a printer to print an image. Also, for example, the applications can include a payment application capable of transferring funds, such as credit card funds, to an entity capable of receiving the funds. In addition, for example, the applications can include one or more messaging applications, such as an E-mail application, short messaging service (SMS), multimedia messaging service (MMS) application or the like, capable of sending and receiving messages that may include text, images, audio, video and/or other multimedia. The applications are typically embodied in software, but as will be appreciated, one or more applications can alternatively be embodied in firmware, hardware or the like.

In accordance with embodiments of the present invention, the terminal **10** is capable of reading a tag type from a tag **46**, and thereafter performing a predefined action based upon the tag type and a state of the terminal. Each tag can have any of a number of different tag types. For example, one or more tags can have the tag type, "Read Only," which designates the respective tag(s) as only being capable of transmitting data to the terminal during operation the method of embodiments of the present invention. Also, for example, one or more tags can have the tag type, "Read/Write," which designates the respective tag(s) as being capable of transmitting data to and/or receiving data from the terminal during operation the method of embodiments of the present invention. In addition, one or more transceivers **49** (e.g., one or more radio frequency transceivers) of one or more other electronic devices **44** may each be capable of operating as a tag during operation of the method of embodiments of the present invention. For more information on such transceivers, see PCT Patent Application PCT/IB03/02900, entitled: Reader Device for Radio Frequency Identification Transponder with Transponder Functionality, filed on Jul. 22, 2003, the contents of which are hereby incorporated by reference in its entirety.

In instances in which one or more transceivers **49** operate as a tag, each transceiver operating as a tag can have the tag type "Transceiver in Show Mode," which designates the respective transceiver as being capable of operating as a tag, typically havipg a "Read Only" tag type. It should be understood, however, that the tag type "Transceiver in Show Mode," tag type can designate the respective transceiver as being capable of functionally operating as a tag having a "Read/Write" tag type. As described herein, the term signaling tag can refer to a tag **46** or a transceiver **49** capable of functionally operating as a tag during operation of embodiments of the present invention.

Attention is now drawn to FIGS. **3**A-C, which illustrate various steps in a method of interacting with a signaling tag in accordance with an embodiment of the present invention. Generally, the method includes the terminal **10** selecting a signaling tag, i.e., a tag **46** or a transceiver **49** capable of operating as a tag, as shown in block **60**. Although the signaling tag can be selected in any of a number of different manners, in one embodiment, the signaling tag is selected by initiating communication with the signaling tag to thereby receive a tag type from the signaling tag. In this regard, the terminal can initiate communication with the signaling tag in any of a number of different manners For example, when the signaling tag comprises a RFID transponder tag or a radio frequency transceiver operating as a tag, the terminal can initiate communication by passing the terminal within a predefined distance of the RFID tag or radio frequency transceiver and receiving an instruction from a user, such as via a user interface of the terminal, to initiate communication with the signaling tag. According embodiments of the present invention, the predefined distance between the signaling tag and the transceiver **48** is typically short such as, for example, from substantially zero to a few centimeters. In such instances, selecting a tag may require touching the terminal to the signaling tag. After initiating communication with the signaling tag, the terminal can send a request or an interrogation signal to the RFID tag for receiving information coded in the tag, which may include, according to one embodiment of the present invention, information relating to the tag type of the RFID tag.

After selecting the signaling tag, the terminal **10** can receive a tag type from the signaling tag, as shown in block **62**. The terminal can receive the tag type in any of a number of different manners, such as via radio frequency transfer from an RFID transponder tag or a radio frequency transceiver. The terminal can directly receive the tag type from the signaling tag. Alternatively, the terminal can indirectly receive the tag type based upon the signaling tag responding to an interrogation signal from the transceiver **48**. In such instances, the transceiver may send one or more interrogation signals to the signaling tag, with each interrogation signal associated with a different tag type. The signaling tag, then, can be configured to only respond to a particular interrogation signal. As the transceiver sends each interrogation signal to the signaling tag, the transceiver can monitor for a response from the signaling tag. When the signaling tag responds to an interrogation signal, then, the transceiver can

identify the tag type associated with the respective interrogation signal as the tag type of the signaling tag.

Irrespective of how the terminal **10** receives the tag type, after receiving the tag type, the terminal can perform a predefined action based upon the tag type and a state of the terminal. In this regard, if the signaling tag has a tag type "Read Only" and the terminal is actively operating an application in a state of receiving data, as shown in blocks **64** and **66** of FIG. **3**B, the terminal can link or otherwise read the data from the tag into the active application, as shown in block **68**. If the terminal is not actively operating an application, however, the terminal can read data from the tag into the terminal and act upon the data, as shown in block **70**. The terminal can act upon the data in any of a number of different manners For example, the terminal can store the data, (e.g., into non-volatile memory **58**). Additionally, or alternatively, for example, the terminal can initiate an application associated with the data or otherwise identified by the data, and read the data into the initiated application.

As an example of a context in which a signaling tag may have "Read Only" tag type, presume that a RFID transponder tag is embedded in a paper advertisement for a consumer good, where the tag has a tag type "Read Only" and stores data including information regarding the consumer good, such as a description of the consumer good and a uniform resource locator (URL) to a Web site that includes an order form for ordering the consumer good. Also, presume that the data stored by the tag identifies an E-mail application as being associated with the data. If the terminal is actively operating an E-mail application, upon selecting the tag, the terminal can read the information regarding the consumer good into an E-mail composition such that a user of the terminal can E-mail the information to a friend. Alternatively, if the terminal is actively operating a Web browser, the terminal can read the URL from the information and retrieve the Web site that includes the order form for ordering the consumer good. If the terminal is not actively operating an application. however, the terminal can read the data stored by the RFID transponder tag and store the information regarding the consumer good, such as until subsequent initiation of the E-mail application, at which point in time the stored data may be provided to the application. Additionally, or alternatively, the terminal can read the data, execute an E-mail application identified by the data. and as before. read the information regarding the consumer good into an E-mail composition.

Again referring to FIGS. **3**A-**3**C, if the signaling tag has a tag type "Read/Write," as shown in block **72**, and if the terminal has an active application operating on the terminal, the terminal can perform an action further based upon a state of the active application. In this regard, if the active application is in a state for receiving data, such as into a text field, the terminal can read data from the tag into the active application, as shown in blocks **74** and **76**. If the active application is in a state of presenting data, such as a selected E-mail message, however, the terminal can write the presented data to the tag, as shown in blocks **78** and **80**. On the other hand, if the signaling tag has a tag type "Read/Write," and the terminal does not have an active application operating on the terminal, as before (see block **70**), the terminal can read data from the tag into the terminal and act upon the data, as shown in block **82**.

As an example of a context in which a signaling tag may have "Read/Write" tag type, presume that a RFID transponder tag with such a "Read/Write" tag type is embedded in the same paper advertisement as above, except that the data stored by the REID transponder tag identifies an organizer application presenting user contact information as being associated with the data. Also, presume that the paper advertisement indicates that customers interested in receiving more information regarding the consumer good can leave their contact information at the advertisement. If the terminal **10** is actively operating an E-mail application, and the E-mail application is in a state of receiving information into a composition, the terminal can read the information regarding the consumer good into the E-mail composition, as before. Also as before, if the terminal is actively operating a Web browser, and the Web browser is in a state of receiving a URL, the terminal can read the URL from the information and retrieve the Web site.

If the user of the terminal **10** desires to leave contact information (e.g., mailing address) to receive more information regarding the consumer good, and if the terminal is actively operating an organizer application that presents user contact information, the contact information can be written to the RFID transponder tag. Subsequently, then, the contact information can be retrieved, such as by a distributor of the consumer good, and information regarding the consumer good sent to the user based upon the contact information. If. on the other hand, the terminal is not actively operating an application, the terminal can read the data stored by the RFID transponder tag, and store the information regarding the consumer good. Additionally, or alternatively, the terminal can read the data, execute an organizer application identified by the data, and as before, write the user's contact information to the tag.

As described herein, when the signaling tag has a tag type "Read Only" or "Read/Write," terminal **10** typically reads the data from the tag and acts upon the data when the terminal does not have an active application operating on the terminal. It should be understood, however, that when the terminal does not have an active application operating on the terminal, the terminal need not read data from the tag or act upon the data. In this regard, the terminal can be configured to read data from the tag only when an active application is operating on the terminal.

As explained above, a transceiver **49** can be capable of operating as a tag **46**, with the transceiver having a tag type "Transceiver in Show Mode." Thus, if the signaling tag has a tag type "Transceiver in Show Mode," as shown in block **84**, and if the terminal **10** is actively operating an application, the terminal can perform an action further based upon a state of the active application operating on the terminal. In this regard, the terminal operates when the tag type is "Transceiver in Show Mode" much like the terminal operates when the tag type is "Read/Write." In contrast to operation when the tag type is "Read/Write," however, a transceiver operating as a tag typically does not itself store data as does a transponder tag generally. Thus, in contrast to operating the terminal when the tag type is "Read/Write," when the tag type is "Transceiver in Show Mode" the terminal typically transmits data to and/or receives data from the electronic device **44** associated with the transceiver, as opposed from the transceiver itself.

The data transmitted to and/or received from the electronic device **44** associated with the transceiver **49** can be determined in any of a number of different manners. In one advantageous embodiment, the data transmitted to and/or received from the electronic device associated with the transceiver can be determined based upon an application actively operating on the terminal and/or the electronic device. In this regard, the data transmitted to the electronic device can be determined based upon data presented by an application actively operating on the terminal **10**. Also, data

received from the electronic device and the manner in which the data is handled can be determined based upon an application actively operating on the electronic device, or based upon data requested by the application actively operating on the terminal. For example, when the electronic device is actively operating an organizer application that presents contact information, the data received from the electronic device can comprise the contact information presented by the organizer application. Further, the data received from the electronic device can comprise default data, such as data stored in a "digital clipboard," as such is well known to those skilled in the art.

Generally, then, in various instances, data is transmitted to and/or received from a tag **46** or electronic device **44** associated with the transceiver **49** operating as a tag, and the terminal **10** and/or the electronic device are actively operating an application. In such instances, selecting the signaling tag generally expresses an intent to transmit and/or receive data relating to one or more of the actively operating application (s). More particularly, selecting a tag or transceiver operating as a tag when the terminal is actively operating an application can express an intent of the terminal to transmit data from and/or receive data into the actively operating application. Similarly, selecting a transceiver operating as a tag when the associated electronic device is actively operating an application can express an intent of the terminal to transmit data into and/or received data from the actively operating application.

Also, whereas the terminal **10** can transmit and/or receive data from the electronic device **44** via the transceiver **49**, the terminal typically transmits and/or receives the data from the electronic device via another means for sharing and/or obtaining data from the electronic device. In this regard, the terminal can communicate with the electronic device via the transceiver to receive one or more connection parameters for another means for sharing and/or obtaining data from the electronic device. Thereafter. the terminal can transmit and/or receive data from the electronic device vie the other means for sharing and/or obtaining data based upon the connection parameters. For example, the terminal can communicate with the electronic device via the transceiver to transmit and receive connection parameters for an infrared, Bluetooth or another wireless networking connection. Then, the terminal can transmit and/or receive data from the other electronic device via a infrared, Bluetooth, or any of a number of different wireless networking techniques, including WLAN techniques such as IEEE 802.11 techniques or the like. Thus, in one typical embodiment, the terminal can receive a tag type ("Transceiver in Show Mode") from the transceiver, and can also receive one or more connection parameters required for establishing communication with the electronic device associated with the transceiver. Then, the terminal can transmit data to and/or receive data from the electronic device via a infrared, Bluetooth, WLAN or the like.

In operation, then, when the signaling tag has a tag type "Transceiver in Show Mode," and if the terminal **10** has an active application operating in a state for receiving data, such as into a text field, the terminal can communicate with the electronic device **44** associated with the transceiver **49** (i.e., signaling tag) to receive data from the electronic device (via, e.g., infrared. Bluetooth, and/or WLAN from an active application operating on the electronic device) into the active application, as shown in blocks **86** and **88**. If the active application is in a state of presenting data, such as a selected E-mail message, however, the terminal can communicate with the electronic device associated with the transceiver to send the presented data to the electronic device (via, e.g., infrared, Bluetooth, and/or WLAN to an active application operating on the electronic device, to memory, etc.), as shown in blocks **90** and **92**. I

If the signaling tag has a tag type "Transceiver in Show Mode," and the terminal **10** is not actively operating an application, the terminal can initiate communication, such as via infrared, Bluetooth, and/or WLAN, with the electronic device associated with the transceiver, as shown in block **94**. The user of the terminal can thereafter operate the terminal to communicate with the electronic device in any of a number of different manners, as desired. For example, the user of the terminal can operate the terminal to transfer files, applications or the like between the terminal and the electronic device.

As will be appreciated. data transmitted to the electronic device **44** from the terminal **10** can, upon receipt, be acted upon by the electronic device in any of a number of different manners. For example, the electronic device can read the data into an application actively operating on the electronic device. If the electronic device is not actively operating an application into which the data can be read, the terminal can execute an application associated with the data or otherwise identified by the data, and read the data into the executed application. In addition to, or in lieu of, reading data into an application, the electronic device can store the data.

As an example of a context in which a signaling tag may have "Transceiver in Show Mode" tag type, presume that a radio frequency transceiver with such a "Transceiver in Show Mode" tag type is associated with a mobile station. If an E-mail application is actively operating on the terminal **10**, and the E-mail application is in a state of receiving information into a composition, the terminal can communicate with the mobile station to receive content into the E-mail composition, such as from an active application, "digital clipboard, or another source identified by the E-mail application. If, on the other hand, the terminal is actively operating a photo editing application presenting an image, the terminal can transmit the image to the mobile station. Upon receipt of the image, then, the mobile station can execute a photo editing application (if not already actively operating on the mobile station) and read the image into the photo editing application, and can store the image, if so desired. If the terminal is not actively operating an application, the terminal can initiate communication with the mobile station, after which the user of the terminal can operate the terminal to communicate with the mobile station, such as to transfer files, applications or the like between the terminal and the mobile station.

As described herein, upon reading a tag type from a signaling tag, the terminal **10** can perform a predefined action based upon the tag type, and if the terminal is actively operating an application, further based upon the application and a state of the application. More particularly, depending upon the tag type, the terminal can read data from the signaling tag into an actively operating application when the application is in a state of receiving data, and can write data to the signaling tag when the application is in a state of presenting data. It should be understood, however, that after the terminal receives the tag type, the terminal need not automatically perform the predefined action based upon the tag type and, if the terminal is actively operating an application, the application and state of the application. In this regard, the terminal can determine the tag type from the signaling tag and thereafter notify a user of the terminal (via e.g., user interface speaker **34**, ringer **36** and/or display **40**, and/or vibrating battery pack) that the terminal can perform

one or more predefined actions based upon the tag type. Thereafter. the terminal can be responsive to a user selection to thereby perform a predefined action based upon the tag type and a user selection.

According to one aspect of the present invention, all or a portion of the system of the present invention, such all or portions of the terminal **14**, generally operates under control of a computer program product. The computer program product for performing the methods of embodiments of the present invention includes a computer-readable storage medium, such as the non-volatile storage medium, and computer-readable program code portions, such as a series of computer instructions, embodied in the computer-readable storage medium.

In this regard, FIGS. **3**A-C are flowcharts of methods, systems and program products according to the invention. It will be understood that each block or step of the flowcharts, and combinations of blocks in the flowcharts, can be implemented by computer program instructions. These computer program instructions may be loaded onto a computer or other programmable apparatus to produce a machine, such that the instructions which execute on the computer or other programmable apparatus create means for implementing the functions specified in the flowchart block(s) or step(s). These computer program instructions may also be stored in a computer-readable memory that can direct a computer or other programmable apparatus to function in a particular manner, such that the instructions stored in the computer-readable memory produce an article of manufacture including instruction means which implement the function specified in the flowchart block(s) or step(s). The computer program instructions may also be loaded onto a computer or other programmable apparatus to cause a series of operational steps to be performed on the computer or other programmable apparatus to produce a computer implemented process such that the instructions which execute on the computer or other programmable apparatus provide steps for implementing the functions specified in the flowchart block(s) or step(s).

Further, FIG. 4 is a flowchart of a method 100. In some embodiments, the method 100 can comprise: receiving information regarding a signaling tag at a terminal at least partially over an air interface via a short-range radio frequency transceiver or interrogator, the information regarding the signaling tag including at least a tag type of the signaling tag, at block 102. In some embodiments, the method 100 can further comprise: determining whether the terminal is actively operating an application, at block 104. In some embodiments, the method 100 can further comprise: if the terminal is actively operating an application, performing a first predefined action based upon the tag type, the application and a state of the application, wherein the first predefined action comprises: initiating communication between the terminal and a device associated with the signaling tag and transmitting data to the device associated with the signaling tag when the tag type indicates that the signaling tag is a radio frequency transceiver and the active application is in a state of presenting data, wherein said transmitting data to the device comprises transmitting the presented data to the device via infra-red, Bluetooth or WLAN communication, at block 106. In some embodiments, the method 100 can further comprise: if the terminal is not actively operating an application, performing a second predefined action based upon the tag type, wherein the second predefined action comprises: reading data from the signaling tag and acting upon the received data when the tag type indicates that the signaling tag comprises a RFID transponder tag capable of at least transmitting data to the terminal, at block 108.

Accordingly, blocks or steps of the flowcharts support combinations of means for performing the specified functions, combinations of steps for performing the specified functions and program instruction means for performing the specified functions. It will also be understood that each block or step of the flowchart, and combinations of blocks or steps in the flowchart, can be implemented by special purpose hardware-based computer systems which perform the specified functions or steps, or combinations of special purpose hardware and computer instructions.

Many modifications and other embodiments of the invention will come to mind to one skilled in the art to which this invention pertains having the benefit of the teachings presented in the foregoing descriptions and the associated drawings. Therefore, it is to be understood that the invention is not to be limited to the specific embodiments disclosed and that modifications and other embodiments are intended to be included within the scope of the appended claims. Although specific terms are employed herein, they are used in a generic and descriptive sense only and not for purposes of limitation.

What is claimed is:

1. A method of interacting with a signaling tag, *wherein the signaling tag comprises a radio frequency identification (RFID) transponder tag or a radio frequency transceiver*, comprising:

receiving information regarding a signaling tag at a terminal at least partially over an air interface *via a short-range radio frequency transceiver or interrogator, the information regarding the signaling tag including at least a tag type of the signaling tag*;

determining whether the terminal is actively operating an application; and

if the terminal is actively operating an application, performing a *first* predefined action based upon the *tag type, the* application and a state of the application, *wherein the first predefined action comprises:*

initiating communication between the terminal and a device associated with the signaling tag and transmitting data to the device associated with the signaling tag when the tag type indicates that the signaling tag is a radio frequency transceiver and the active application is in a state of presenting data, wherein said transmitting data to the device comprises transmitting the presented data to the device via infra-red, Bluetooth or wireless local area network (WLAN) communication; and

if the terminal is not actively operating an application, performing a second predefined action based upon the tag type, wherein the second predefined action comprises:

reading data from the signaling tag and acting upon the received data when the tag type indicates that the signaling tag comprises a RFID transponder tag capable of at least transmitting data to the terminal.

2. A method according to claim **1**, wherein performing **[**a**]** *the first* predefined action comprises reading data from the signaling tag into an actively operating application when:

the information regarding the signaling tag indicates that the signaling tag is *a RFID transponder tag* capable of at least transmitting data to the terminal;

the terminal is actively operating an application; and

the application is in a state of receiving data.

3. A method according to claim 1, wherein performing [a] *the first* predefined action comprises reading data from the signaling tag into the terminal when the information regarding the signaling tag indicates that the signaling tag is *a RFID transponder tag* capable of at least transmitting data to the terminal and [one of:

the terminal is not actively operating an application; and]

the terminal is actively operating an application in a state other than a state of receiving data.

4. A method according to claim 1, wherein performing [a] *the first* predefined action comprises writing data to the signaling tag when:

the information regarding the signaling tag indicates that the signaling tag is *a RFID transponder tag* capable of at least receiving data;

the terminal is actively operating an application; and

the application is in a state of presenting data.

5. A method according to claim 1, wherein performing [a] *the first* predefined action comprises reading data from the signaling tag into the terminal when:

the information regarding the signaling tag indicates that the signaling tag is *a RFID transponder tag* capable of at least transmitting data and [one of:

the terminal is not actively operating an application; and]

the terminal is actively operating an application in a state other than a state of one of receiving data and presenting data.

6. A method according to claim 1, wherein the signaling tag comprises a *radio frequency* transceiver, wherein performing [a] *the first* predefined action comprises reading data from a device associated with the *radio frequency* transceiver into an actively operating application when:

the information regarding the signaling tag indicates that the *radio frequency* transceiver is capable of at least transmitting data;

the terminal is actively operating an application; and

the application is in a state of receiving data, and

wherein reading data from the device comprises reading data from the device in a manner independent of the *radio frequency* transceiver.

7. A method according to claim 6 further comprising:

receiving at least one connection parameter from the device via the *radio frequency* transceiver, wherein reading data from the device comprises reading data from the device based upon the at least one connection parameter and in a manner independent of the *radio frequency* transceiver.

8. A method according to claim 1, wherein the signaling tag comprises a *radio frequency* transceiver, wherein performing [a] *the first* predefined action comprises writing data to a device associated with the *radio frequency* transceiver when:

the information regarding the signaling tag indicates that the *radio frequency* transceiver is capable of at least receiving data;

the terminal is actively operating an application; and

the application is in a state of presenting data, and

wherein writing data to the device comprises writing data to the device in a manner independent of the *radio frequency* transceiver.

9. A method according to claim 8 *wherein the radio frequency transceiver is one of a short-range radio frequency transceiver or interrogator, the method* further comprising:

receiving at least one connection parameter from the device via the *short-range radio frequency* transceiver *or interrogator*, wherein writing data to the device comprises writing data to the device based upon the at least one connection parameter and in a manner independent of the *short-range radio frequency* transceiver *or interrogator*.

10. A method according to claim 1, wherein the signaling tag comprises a *radio frequency* transceiver, wherein performing [a] *the first* predefined action comprises initiating communication between the terminal and a device associated with the *radio frequency* transceiver when the information regarding the signaling tag indicates that the *radio frequency* transceiver is capable of at least transmitting data and [one of:

the terminal is not actively operating an application; and]

the terminal is actively operating an application in a state other than a state of one of receiving data and presenting data, and

wherein initiating communication comprises initiating communication between the terminal and the device in a manner independent of the *radio frequency* transceiver.

11. A method according to claim 1 further comprising:

selecting a signaling tag before receiving information regarding the signaling tag[, wherein the signaling tag comprises a Radio Frequency Identification (RFID) transponder tag].

12. A method according to claim 11 further comprising:

sending an interrogation signal to the RFID transponder tag, wherein receiving information regarding a signaling tag comprises receiving a tag type from the RFID transponder tag in response to the interrogation signal.

13. A method according to claim 11 further comprising:

sending at least one interrogation signal to the RFID transponder tag, wherein each interrogation signal is associated with a different tag type;

receiving a response from the RFID transponder tag to one of the at least one interrogation signal that triggers the response; and

identifying a tag type based upon the interrogation signal that triggers the response, wherein receiving information regarding a signaling tag comprises receiving the identified tag type.

14. A method according to claim 11, wherein selecting a signaling tag comprises passing the terminal within a predefined distance of a signaling tag.

15. A terminal for interacting with a signaling tag *wherein the signaling tag comprises a radio frequency identification (RFID) transponder tag or a radio frequency transceiver, the terminal* comprising:

a controller capable of actively operating an application, wherein the controller is capable of receiving information regarding a signaling tag at least partially over an air interface *via a short-range radio frequency transceiver or interrogator, the information regarding the signaling tag including at least a tag type of the signaling tag*, wherein the controller is also capable of determining whether the terminal is actively operating an application, and

if the controller is actively operating an application, performing a *first* predefined action based upon the *tag type, the* application and a state of the application, *wherein the first predefined action comprises:*

initiating communication between the terminal and a device associated with the signaling tag and transmitting data to the device associated with the signaling tag when the tag type indicates that the signaling tag is a radio frequency transceiver and the active application is in a state of presenting data;

wherein said transmitting data to the device comprises transmitting the presented data to the device via infrared, Bluetooth or wireless local area network (WLAN) communication; and

if the terminal is not actively operating an application, performing a second predefined action based upon the tag type, wherein the second predefined action comprises:

reading data from the signaling tag and acting upon the received data when the tag type indicates that the signaling tag comprises a RFID transponder tag capable of at least transmitting data to the terminal.

16. A terminal according to claim **15**, wherein the controller is capable of performing **[**a**]** *the first* predefined action by reading data from the signaling tag into an actively operating application when:

the information regarding the signaling tag indicates that the signaling tag is *a RFID transponder tag* capable of at least transmitting data to the terminal;

the controller is actively operating an application; and

the application is in a state of receiving data.

17. A terminal according to claim **15**, wherein the controller is capable of performing **[**a**]** *the first* predefined action by reading data from the signaling tag into the terminal when the information regarding the signaling tag indicates that the signaling tag is *a transponder tag* capable of at least transmitting data to the terminal and **[**one of:

the controller is not actively operating an application; and**]**

the controller is actively operating an application in a state other than a state of receiving data.

18. A terminal according to claim **15**, wherein the controller is capable of performing **[**a**]** *the first* predefined action by writing data to the signaling tag when:

the information regarding the signaling tag indicates that the signaling tag is *a RFID transponder tag* capable of at least receiving data;

the controller is actively operating an application; and

the application is in a state of presenting data.

19. A terminal according to claim **15**, wherein the controller is capable of performing **[**a**]** *the first* predefined action by reading data from the signaling tag into the terminal when:

the information regarding the signaling tag indicates that the signaling tag is *a RFID transponder tag* capable of at least transmitting data and **[**one of:

the controller is not actively operating an application; and**]**

the controller is actively operating an application in a state other than a state of one of receiving data and presenting data.

20. A terminal according to claim **15**, wherein the signaling tag comprises a *radio frequency* transceiver, wherein the controller is capable of performing **[**a**]** *the first* predefined action by reading data from a device associated with the *radio frequency* transceiver into an actively operating application when:

the information regarding the signaling tag indicates that the *radio frequency* transceiver is capable of at least transmitting data;

the controller is actively operating an application; and

the application is in a state of receiving data, and

wherein the controller is capable of reading data from the device in a manner independent of the *radio frequency* transceiver.

21. A terminal according to claim **20**, wherein *the radio frequency transceiver is one of a short-range radio frequency transceiver or an interrogator, wherein* the controller is capable of receiving at least one connection parameter from the device via the short-range radio frequency transceiver or interrogator, and wherein the controller is capable of reading data from the device based upon the at least one connection parameter and in a manner independent of the *short-range radio frequency* transceiver *or interrogator*.

22. A terminal according to claim **15**, wherein the signaling tag comprises a *radio frequency* transceiver, wherein the controller is capable of performing **[**a**]** *the first* predefined action by writing data to a device associated with the *radio frequency* transceiver when:

the information regarding the signaling tag indicates that the *radio frequency* transceiver is capable of at least receiving data;

the controller is actively operating an application; and

the application is in a state of presenting data, and

wherein the controller is capable of writing data to the device in a manner independent of the *radio frequency* transceiver.

23. A terminal according to claim **22**, wherein *the radio frequency transceiver is one of a short-range radio frequency transceiver or an interrogator, wherein* the controller is capable of receiving at least one connection parameter from the device via the *short-range radio frequency* transceiver *or interrogator*, and wherein the controller is capable of writing data to the device based upon the at least one connection parameter and in a manner independent of the *short-range radio frequency* transceiver *or interrogator*.

24. A terminal according to claim **15**, wherein the signaling tag comprises a *radio frequency* transceiver, wherein the controller is capable of performing **[**a**]** *the first* predefined action by initiating communication a device associated with the *radio frequency* transceiver when the information regarding the *radio frequency* transceiver indicates that the transceiver is capable of at least transmitting data and **[**one of:

the controller is not actively operating an application; and**]**

the controller is actively operating an application in a state other than a state of one of receiving data and presenting data, and

wherein the controller is capable of initiating communication with the device in a manner independent of the *radio frequency* transceiver.

25. A terminal according to claim **15**, wherein the controller is further capable of selecting a signaling tag before receiving information regarding the signaling tag**[**, wherein the signaling tag comprises a Radio Frequency Identification (RFID) transponder tag**]**.

26. A terminal according to claim **25**, wherein *the radio frequency transceiver is one of a short-range radio frequency transceiver or an interrogator, wherein* the controller is further capable of sending an interrogation signal to the RFID transponder tag via the *short-range radio frequency* transceiver *or interrogator*, wherein the controller is capable of receiving information regarding a signaling tag comprising a tag type from the RFID transponder tag in response to the interrogation signal.

27. A terminal according to claim **25**, wherein the controller is capable of sending at least one interrogation signal to the RFID transponder tag, wherein each interrogation signal is associated with a different tag type, wherein the controller is capable of receiving a response from the RFID transponder tag to one of the at least one interrogation signal that triggers the response, and wherein the controller is also capable of identifying a tag type based upon the interroga-

tion signal that triggers the response, wherein the information regarding a signaling tag comprises the identified tag type.

28. A terminal according to claim **25** further comprising:

a transceiver coupled to the controller, wherein the controller is capable of selecting a signaling tag by the transceiver being passed within a predefined distance of a signaling tag.

29. A computer program product for interacting with a signaling tag, *wherein the signaling tag comprises a radio frequency identification (RFID) transponder tag or a radio frequency transceiver*, the computer program product comprising a *non-transitory* computer-readable storage medium having computer-readable program code portions stored therein, the computer-readable program code portions comprising: a first executable portion receiving information regarding a signaling tag at a terminal at least partially over an air interface *via a short-range radio frequency transceiver or interrogator, the information regarding the signaling tag including at least a tag type of the signaling tag*; a second executable portion for determining, whether the terminal is actively operating an application; and if the terminal is actively operating an application, a third executable portion for performing a *first* predefined action based upon the application and a state of the application, *wherein the first predefined action comprises: initiating communication between the terminal and a device associated with the signaling tag and transmitting data to the device associated with the signaling tag when the tag type indicates that the signaling tag is a radio frequency transceiver and the active application is in a state of presenting data; wherein said transmitting data to the device comprises transmitting the presented data to the device via infra-red. Bluetooth or wireless local area network (WLAN) communication; and if the terminal is not actively operating an application, performing a second predefined action based upon the tag type, wherein the second predefined action comprises: reading data from the signaling tag and acting upon the received data when the tag indicates that the signaling tag comprises a RFID transponder tag capable of at least transmitting data to the terminal.*

30. A computer program product according to claim **29**, wherein the third executable portion is adapted to perform **[**a**]** *the first* predefined action by reading data from the signaling tag into an actively operating application when:

the information regarding the signaling tag indicates that the signaling tag is *a RFID transponder tag* capable of at least transmitting data to the terminal;

the terminal is actively operating an application; and

the application is in a state of receiving data.

31. A computer program product according to claim **29**, wherein the third executable portion is adapted to perform **[**a**]** *the first* predefined action by reading data from the signaling tag into the terminal when the information regarding the signaling tag indicates that the signaling tag is *a RFID transponder tag* capable of at least transmitting data to the terminal and **[**one of:

the terminal is not actively operating an application; and**]**

the terminal is actively operating an application in a state other than a state of receiving data.

32. A computer program product according to claim **29**, wherein the third executable portion is adapted to perform **[**a**]** *the first* predefined action by writing data to the signaling tag when:

the information regarding the signaling tag indicates that the signaling tag is *a RFID transponder tag* capable of at least receiving data;

the terminal is actively operating an application; and

the application is in a state of presenting data.

33. A computer program product according to claim **32**, wherein the third executable portion is adapted to perform **[**a**]** *the first* predefined action by reading data from the signaling tag into the terminal when:

the information regarding the signaling tag indicates that the signaling tag is *a RFID transponder tag* capable of at least transmitting data and **[**one of:

the terminal is not actively operating an application; and**]**

the terminal is actively operating an application in a state other than a state of one of receiving data and presenting data.

34. A computer program product according to claim **29**, wherein the signaling tag comprises a *radio frequency* transceiver, wherein the third executable portion is adapted to perform **[**a**]** *the first* predefined action by reading data from a device associated with the *radio frequency* transceiver into an actively operating application when:

the information regarding the signaling tag indicates that the *radio frequency* transceiver is capable of at least transmitting data;

the terminal is actively operating an application; and

the application is in a state of receiving data, and

wherein the third executable portion is adapted to read data from the device in a manner independent of the *radio frequency* transceiver.

35. A computer program product according to claim **34** *wherein the radio frequency transceiver is one of a short-range radio frequency transceiver or an interrogator, the computer program product* further comprising:

a fourth executable portion for receiving at least one connection parameter from the device via the *short-range radio frequency* transceiver *or interrogator*, wherein the third executable portion is adapted to perform **[**a**]** *the first* predefined action by reading data from the device based upon the at least one connection parameter and in a manner independent of the *short-range radio frequency* transceiver *or interrogator*.

36. A computer program product according to claim **29**, wherein the signaling tag comprises a *radio frequency* transceiver, wherein the third executable portion is adapted to perform **[**a**]** *the first* predefined action by writing data to a device associated with the *radio frequency* transceiver when:

the information regarding the signaling tag indicates that the *radio frequency* transceiver is capable of at least receiving data;

the terminal is actively operating an application; and

the application is in a state of presenting data, and

wherein the third executable portion is adapted to write data to the device in a manner independent of the *radio frequency* transceiver.

37. A computer program product according to claim **36** *wherein the radio frequency transceiver is one of a short-range radio frequency transceiver or an interrogator, the computer program product* further comprising:

a fourth executable portion for receiving at least one connection parameter from the device via the *short-range radio frequency* transceiver *or interrogator*, wherein the third executable portion is adapted to perform **[**a**]** *the first* predefined action by writing data to the device based upon the at least one connection parameter and in a manner independent of the *short-range radio frequency* transceiver *or interrogator*.

38. A computer program product according to claim **29**, wherein the signaling tag comprises a *radio frequency*

transceiver, wherein the third executable portion is adapted to perform [a] *the first* predefined action by initiating communication between the terminal and the device associated with the *radio frequency* transceiver when the information regarding the signaling tag indicates that the *radio frequency* transceiver is capable of at least transmitting data and [one of:

the terminal is not actively operating an application; and]

the terminal is actively operating an application in a state other than a state of one of receiving data and presenting data, and

wherein the third executable portion is adapted to initiate communication between the terminal and the device in a manner independent of the *radio frequency* transceiver.

39. A computer program product according to claim **29** further comprising:

a fourth executable portion for selecting a signaling tag before the first executable portion receives information regarding the signaling tag, wherein the signaling tag comprises a Radio Frequency Identification (RFID) transponder tag.

40. A computer program product according to claim **39** further comprising:

a fifth executable portion for sending an interrogation signal to the RFID transponder tag, wherein the first executable portion is adapted to receive information regarding a signaling tag comprising a tag type from the RFID transponder tag in response to the interrogation signal.

41. A computer program product according to claim **39** further comprising:

a fifth executable portion for sending at least one interrogation signal to the RFID transponder tag, wherein each interrogation signal is associated with a different tag type;

a sixth executable portion for receiving a response from the RFID transponder tag to one of the at least one interrogation signal that triggers the response; and

a seventh executable portion for identifying a tag type based upon the interrogation signal that triggers the response, wherein the first executable portion is adapted to receive information regarding a signaling tag comprising the identified tag type.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : RE48,868 E
APPLICATION NO. : 16/245622
DATED : December 28, 2021
INVENTOR(S) : Jalkanen et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In the Claims

Column 19,
Line 39, "*the tag indicates*" should read --*the tag type indicates*--.

Signed and Sealed this
Twenty-second Day of November, 2022

Katherine Kelly Vidal

Katherine Kelly Vidal
Director of the United States Patent and Trademark Office