



(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2002/0160820 A1**

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(43) **Pub. Date: Oct. 31, 2002**

(54) **ENHANCE MOBILITY OF A BLUETOOTH HEADSET BEYOND THE REACH SUPPORTED BY BLUETOOTH**

(57) **ABSTRACT**

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A communications system such as a local area data network is equipped with a plurality of access points each capable of emulating either a phone mated with a wireless headset, the wireless headset, or both and establishing a link between access points emulating the phone and the headset. When the phone is within range of an access point and the wireless headset moves out of range with the phone but within range of an access point, the access point within range of the phone emulates the headset, the access point within range of the headset emulates the phone, and a communications path is established (if necessary) between the access points. In this manner, the effective range of the headset with respect to the associated phone is extended beyond a distance limit for a wireless communications protocol, such as Bluetooth, employed for the headset and phone.

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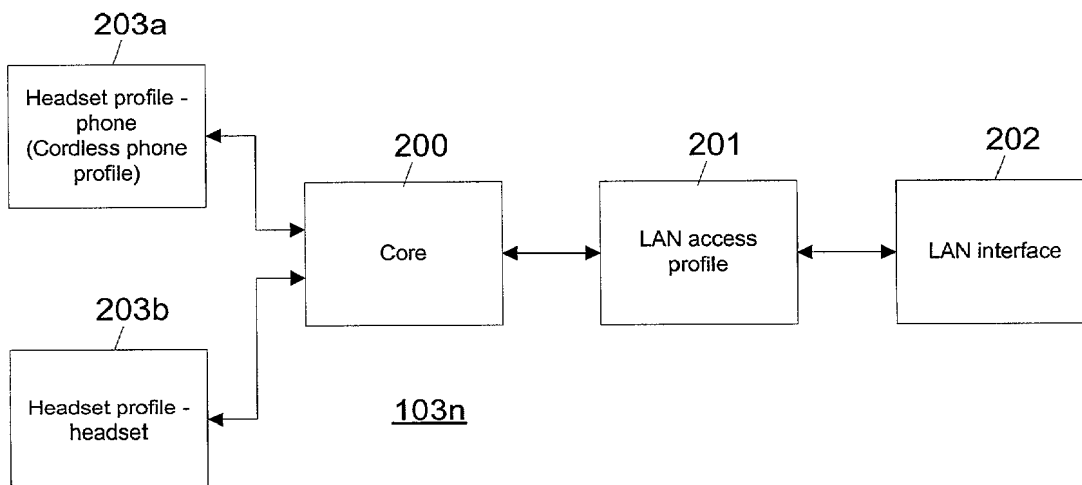
(21) Appl. No.: **09/846,073**

(22) Filed: **Apr. 30, 2001**

**Publication Classification**

(51) **Int. Cl.<sup>7</sup> ..... H04M 1/00**

(52) **U.S. Cl. .... 455/568; 455/41**



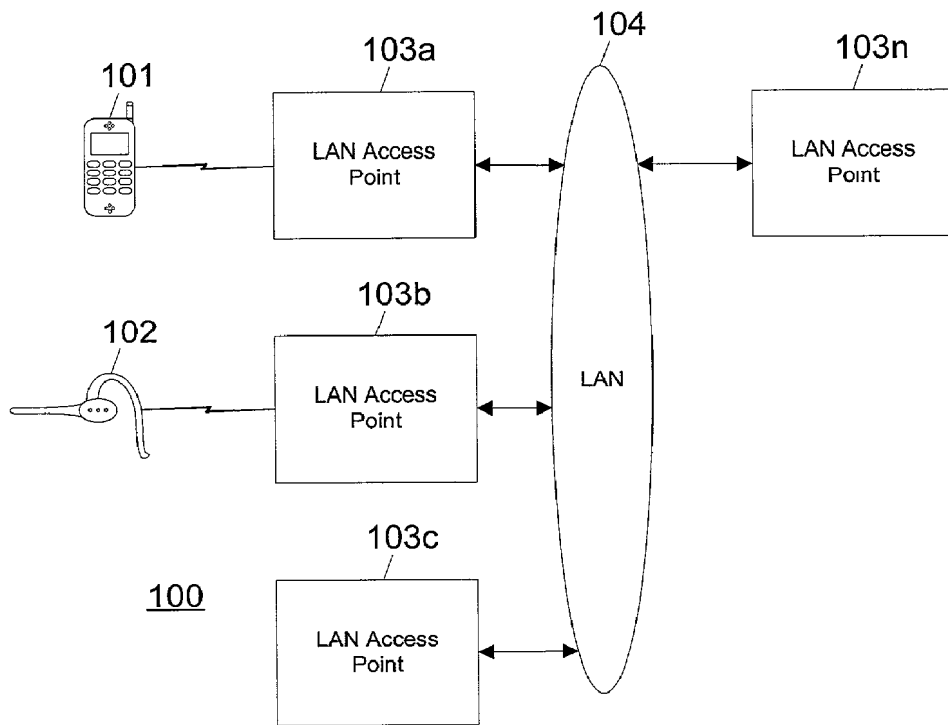


FIGURE 1

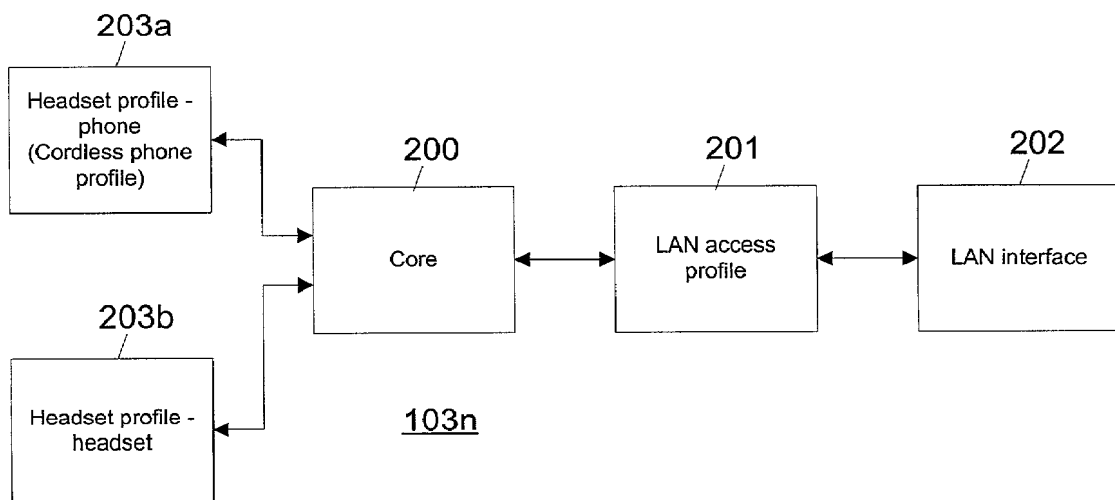


FIGURE 2

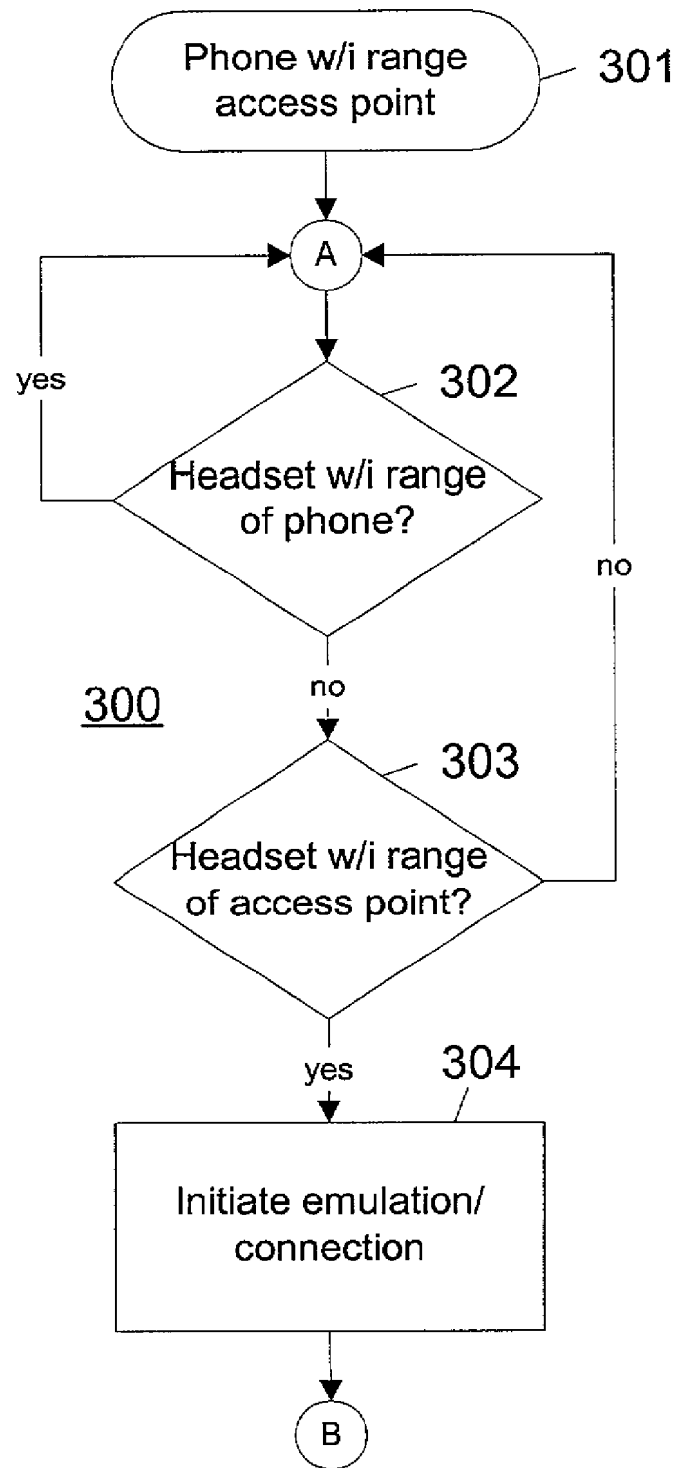


FIGURE 3A

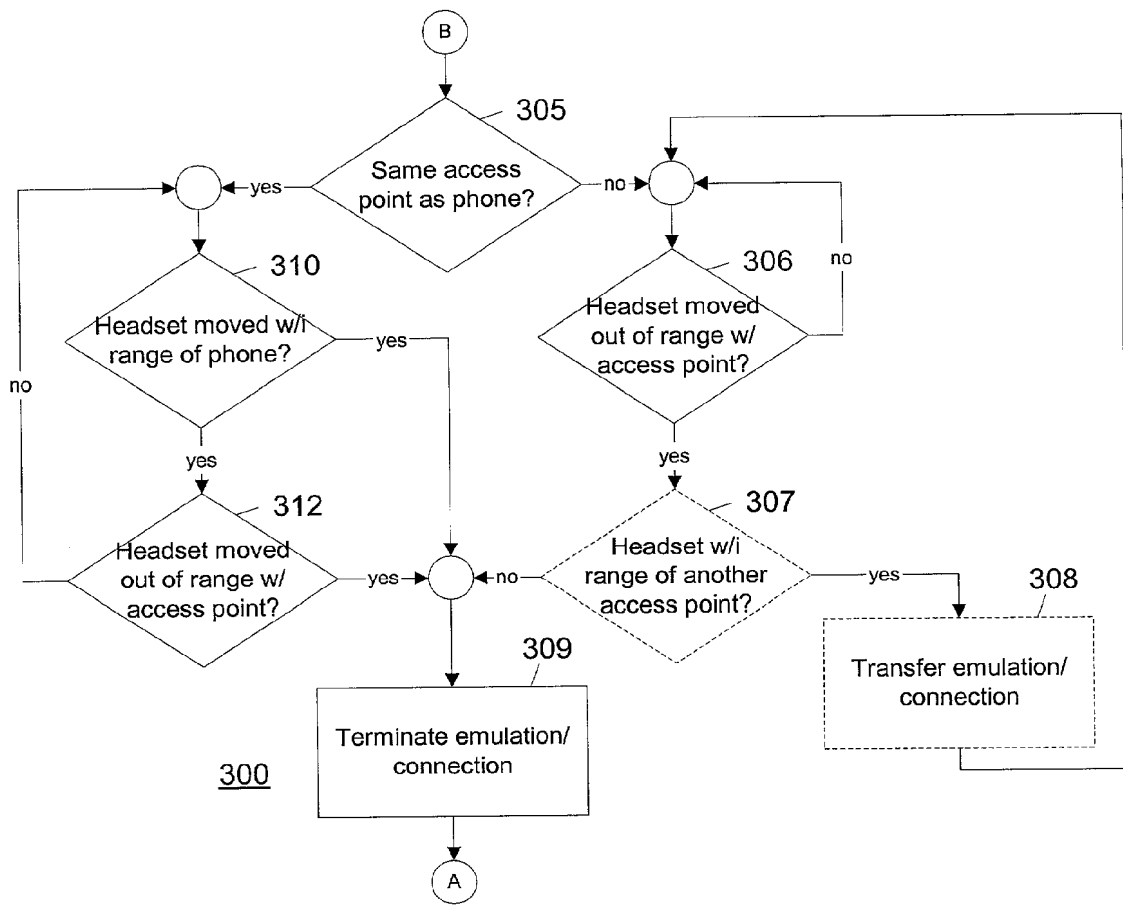


FIGURE 3B

## ENHANCE MOBILITY OF A BLUETOOTH HEADSET BEYOND THE REACH SUPPORTED BY BLUETOOTH

### TECHNICAL FIELD OF THE INVENTION

[0001] The present invention is directed, in general, to connectivity for wireless telephone headsets and, more specifically, to improving the mobility of wireless headsets with regard to associated phones despite distance constraints for direct wireless connection of the headset and phone.

### BACKGROUND OF THE INVENTION

[0002] The Bluetooth specification, promulgated by the Bluetooth Special Interest Group (Bluetooth SIG, Inc.) and available at [www.bluetooth.com](http://www.bluetooth.com), relates to wireless connectivity of various devices, such as computers, personal digital assistants (PDAs), wireless telephones, and the like. Generally speaking, Bluetooth is a short-range radio frequency (RF) technology which enables features such as cable replacement (with wireless connections), wireless local area network (LAN) access within a short distance, and ad-hoc networks between several devices.

[0003] The Bluetooth specification includes a “core,” which specifies components such as the radio, baseband, link manager, service discovery protocol, transport layer, and interoperability with different communication protocols, and “profiles,” which specify the protocols and procedures for different types of applications.

[0004] Bluetooth normally supports distances of up to 10 meters. As a result, wireless headset users must remain within 10 meters of the phone with which the headset is associated, for example by carrying the (mobile) phone as well as the headset or by remaining within the proximity of the (stationary) phone.

[0005] For stationary phones, the problems associated with the distance limitation are self-evident. Even for mobile phones, however, the constraint on distance separating the headset and phone is problematic. For example, many users will customarily remove their phones from the belt clip while in their office or work space, place the phone on a desk or table (for example, in a charging cradle), then forget the phone when leaving their immediate work space. Movement significantly outside the user’s work space will quickly separate the phone and headset by a distance larger than 10 meters, causing the user to miss incoming calls and be unable to place outgoing calls.

[0006] Alternatively, the phone—especially a media phone or a phone with an integral personal digital assistant and/or personal computer-type application capabilities (such as the Nokia 9210 Communicator)—may be in use (i.e., connected to a projector to display some data), preventing the user from carrying the phone when moving outside their workspace or a meeting location.

[0007] There is, therefore, a need in the art for extending the operational range of wireless headsets and improving the mobility of such headsets with regard to associated phones.

### SUMMARY OF THE INVENTION

[0008] To address the above-discussed deficiencies of the prior art, it is a primary object of the present invention to

provide, for use in a communications system such as a local area data network, a plurality of access points each capable of emulating either a phone mated with a wireless headset, the wireless headset, or both and of establishing a link between access points emulating the phone and the headset. When the phone is within range of an access point and the wireless headset moves out of range with the phone but within range of an access point, the access point within range of the phone emulates the headset, the access point within range of the headset emulates the phone, and a communications path is established (if necessary) between the access points. In this manner, the effective range of the headset with respect to the associated phone is extended beyond a distance limit for a wireless communications protocol, such as Bluetooth, employed for the headset and phone.

[0009] The foregoing has outlined rather broadly the features and technical advantages of the present invention so that those skilled in the art may better understand the detailed description of the invention that follows. Additional features and advantages of the invention will be described hereinafter that form the subject of the claims of the invention. Those skilled in the art will appreciate that they may readily use the conception and the specific embodiment disclosed as a basis for modifying or designing other structures for carrying out the same purposes of the present invention. Those skilled in the art will also realize that such equivalent constructions do not depart from the spirit and scope of the invention in its broadest form.

[0010] Before undertaking the DETAILED DESCRIPTION of the INVENTION below, it may be advantageous to set forth definitions of certain words or phrases used throughout this patent document: the terms “include” and “comprise,” as well as derivatives thereof, mean inclusion without limitation; the term “or” is inclusive, meaning and/or; the phrases “associated with” and “associated therewith,” as well as derivatives thereof, may mean to include, be included within, interconnect with, contain, be contained within, connect to or with, couple to or with, be communicable with, cooperate with, interleave, juxtapose, be proximate to, be bound to or with, have, have a property of, or the like; and the term “controller” means any device, system or part thereof that controls at least one operation, whether such a device is implemented in hardware, firmware, software or some combination of at least two of the same. It should be noted that the functionality associated with any particular controller may be centralized or distributed, whether locally or remotely. Definitions for certain words and phrases are provided throughout this patent document, and those of ordinary skill in the art will understand that such definitions apply in many, if not most, instances to prior as well as future uses of such defined words and phrases.

### BRIEF DESCRIPTION OF THE DRAWINGS

[0011] For a more complete understanding of the present invention, and the advantages thereof, reference is now made to the following descriptions taken in conjunction with the accompanying drawings, wherein like numbers designate like objects, and in which:

[0012] **FIG. 1** depicts a system for extending the range of a wireless headset beyond the distance supported by an applicable wireless communications protocol according to one embodiment of the present invention;

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