A multi-functional wireless device (10), comprising: a wireless transceiver (9) to wirelessly communicate with another device (50); at least two speakers (20, 21) to reproduce stereophonic sound; and at least one microphone (22) such that the one of the at least two speakers (20, 21) is proximal to an ear of a user and the at least one microphone (22) is proximal to the mouth of the user; wherein the wireless device (10) is operable in at least two modes when in wireless communication with the another device (50); a first mode being a telephone handset using one of the at least two speakers (20, 21) and the at least one microphone (22); and a second mode being a stereo loudspeaker using the at least two speakers (20, 21).
Title

A multi-functional wireless device

Technical Field

The invention concerns a multi-functional wireless device.

Background of the Invention

Some homes and offices have many electronic devices to perform specific functions. To reduce clutter and also to improve the ambience and mood of a room, there is a desire to provide an aesthetic device that performs multiple functions.

Summary of the Invention

In a first preferred aspect, there is provided a multi-functional wireless device, comprising:

- a wireless transceiver to wirelessly communicate with another device;
- at least two speakers to reproduce stereophonic sound; and
- at least one microphone;

wherein the wireless device is operable in at least two modes when in wireless communication with the another device, a first mode being a telephone handset using one of the at least two speakers and the at least one microphone such that the one of the at least two speakers is proximal to an ear of a user and the at least one microphone is proximal to the mouth of the user; and a second mode being a stereo loudspeaker using the at least two speakers.

The device may further comprise a conference call microphone to enable the wireless device to be used for a conference call.

The device may further comprise a base station for charging the wireless device when the wireless device is docked with the base station.

The another device may be a mobile device or a personal computer.

The base station may include a tractable tray for receiving the mobile device to charge the mobile device, the tractable tray sliding in and out from the base station.

The mobile device may be a portable music player or mobile phone.
The wireless device may wirelessly communicates with the another device using the Bluetooth™ protocol.

In a second aspect, there is provided a communication system with music playback, the system comprising:

- a multi-functional wireless device including:
  - a wireless transceiver to wirelessly communicate with another device;
  - at least two speakers to reproduce stereophonic sound; and
  - at least one microphone;
- wherein the wireless device is operable in at least two modes when in wireless communication with the another device, a first mode being a telephone handset using one of the at least two speakers and the at least one microphone; and a second mode being a stereo loudspeaker using the at least two speakers; and
- a base station for charging the wireless device when the wireless device is docked with the base station.

**Brief Description of the Drawings**

An example of the invention will now be described with reference to the accompanying drawings, in which:

- Figure 1 is a front perspective view of a multi-functional wireless device in accordance with a preferred embodiment of the present invention docked with a base station;
- Figure 2 is a front perspective view of the device of Figure 1 with a mobile phone received in a retractable tray of the base station;
- Figure 3 is a front perspective view of the device of Figure 1 showing the device being detached from the base station;
- Figure 4 is a set of plan views of the front and rear of the device of Figure 1;
- Figure 5 is a set of plan views of the top and bottom of the device of Figure 1;
- Figure 6 is a set of plan views of the top and bottom of the base station;
- Figure 7 is a set of plan views of the front and rear of the base station; and
- Figure 8 is a sequence showing certain operating procedures for the device of Figure 1.
Detailed Description of the Drawings

Referring to the drawings, a multi-functional wireless device 10 is provided. The device 10 combines a Bluetooth™ wireless handset, a Bluetooth™ wireless conference call device, a Bluetooth™ wireless high quality speaker and a mobile phone charging and syncing dock. The device 10 generally comprises: a wireless transceiver 9, at least two speakers 20, 21 and at least one microphone 22. The wireless transceiver 9 wirelessly communicates with another device, for example, a mobile phone 50, music player 50 or personal computer. Some mobile phones 50 also provide music playback such as the Apple iPhone™. The device 10 must be paired with another device. In one example, the device 10 is paired with a Bluetooth™ enabled mobile phone. The two speakers 20, 21 reproduce stereophonic sound. Using two identical speakers 20, 21 in a symmetrical configuration of loudspeakers produces the best results for stereophonic sound and positioned in front of and equidistant from the listener. The microphone 22 is used for a telephone call. The device 10 is operable in at least two modes when in wireless communication with the another device. The first mode is a telephone handset using one or two speakers 20, 21 and the microphone 22. The second mode is a stereo loudspeaker using the two speakers 20, 21.

Also provided is a base station 30 for charging the device 10 when the device 10 is docked with the base station 30. The base station 30 includes a retractable tray 31 for receiving the mobile device 50 to charge the mobile device 50. The retractable tray slides in and out from the base station 30.

Turning to Figure 4, on the rear side of the device 10 is a power button 11 which is illuminated with an LED 81. Turning to Figure 5, on the left side of the device 10 there are plus and minus volume buttons 12, 13. The volume buttons 12, 13 increase or decrease the volume coming from the speakers 20, 21. Near the volume buttons 12, 13 is a conference call microphone 14 to enable the device 10 to be used for a conference call. Charging pins 15 are located on the right side of the device 10 to connect with charging connectors 32 on the base station 30 to charge the device 10 when docked.

When the device 10 is functioning as a telephone, there are two options available: private call mode and conference call mode. Private call mode requires the device 10 to be used as a telephone handset and is placed against the face of the user like a conventional telephone handset. As a telephone handset, the distance
between the microphone 22 and the speaker 20 is predetermined, for example, 15 centimeters apart. This means that when the handset is placed against the face of the user, the speaker 20 is proximal to the ear and the microphone 22 is proximal to the mouth. Therefore the traditional form factor of a telephone handset that the user is familiar with is provided. Private call mode prevents or minimises eavesdropping by other parties in the general vicinity of the device 10. In private call mode, only one speaker 20 is activated and the microphone 22 is activated. In conference call mode, which may be considered a third mode of the device 10, the device 10 is placed on a table or another flat surface. The two speakers 20, 21 are activated and the conference call microphone 14 is activated for up to four people to participate in a conference call. To make a telephone call using the device 10, the mobile phone 50 is used to dial a telephone number and the user(s) speak and listen through the device 10. The user may switch between private call mode and conference call mode by pressing the power button 11 during the call.

When the device 10 is functioning as a music speaker, both microphones 22, 14 are muted and the two speakers 20, 21 are activated. The device 10 automatically switches to stereo loudspeaker mode when it receives a music streaming signal via Bluetooth™. The device 10 plays at 70% volume level if it is not docked in the base station 30 when playing music. To play at 100% volume level, the device 10 needs to be docked with the base station 30 and connected to the mains electrical power supply. The mobile phone 50 can control the music playback via the device 10 including volume control, play/pause, skip forward/backward, and fast forward/rewind. Surround effect can be enabled or disabled by double pressing the power button 11 during music playback.

Turning to Figure 6, the charging connectors 32 are located on the top of the base station 30. On the bottom of the base station are silicon pads 35 for increasing frictional resistance to prevent movement of the base station 30 when placed on a surface such as a table or shelf.

Turning to Figure 7, on the rear side of the base station 30 is an AC charging pin 33 to connect with an AC adaptor to receive power from a mains electrical power supply. A micro USB port 34 is provided for a USB cable to connect the base station 30 to a personal computer. This enables the mobile phone 50 or music player 50 which is docked with the base station 30 to synchronise with the personal computer via the base station 30.
Referring to Figure 8, when the device 10 has low battery life in a connected status, an LED 80 adjacent to the volume buttons 12, 13 and conference call microphone 14 is constantly illuminated to indicate the low battery life. The user places the device 10 onto the base station 30 to charge it. When the device 10 has low battery life in an unconnected status, the LED 80 starts blinking. The user places the device 10 onto the base station 30 to charge it. To turn on the device 10, the power button 11 is pressed and held for three seconds. When the device 10 is on, an activation sound is generated and the LED 81 is illuminated. To turn off the device 10, the power button 11 is pressed and held for three seconds. When the device is off, a deactivation sound is generated and the LED 81 is no longer illuminated.

The device 10 also features rejecting incoming calls by pressing and holding an MFB button 16 located between the volume buttons 12, 13 for about two seconds. The last telephone number can be redialed by double pressing the MFB button 16. Ending an active call and accepting a waiting call is performed by quickly pressing the MFB button 16 during a call. Holding an active call and accepting a waiting call is performed by double pressing the MFB button 16 during a call. To switch between these calls later, the MFB button 16 is double pressed again during the call. The device 10 enables voice activated dialing depending on the mobile phone 50 used. The mobile phone 50 must have voice-tags set up, and if so, a voice-activated call is initiated by pressing the MFB button 16 for two seconds then releasing it. A tiny audio sound is played which indicates the user is to speak the name of the person to call. To mute a call, the power button 11 is double pressed during the call. To un-mute, the power button 11 is also double pressed.

The radio frequency range of the device 10 is 2.4 - 2.4835Ghz and a maximum range in open space of about 10 metres. Supported profiles include: HSP, HFP, A2DP and AVRCP. The rechargeable battery 8 for the device 10 is a Lithium-ion type providing a talk time/working time of two hours and a standby time of one hundred and twenty hours. The speakers 20, 21 provide an output out 2 X 2W RMS with a frequency range of 20 Hz to 20 kHz. The total harmonic distribution is less than 0.1% at 2W output.

Although Bluetooth™ has been described, other wireless protocols may be used.
It is envisaged that the base station 30 may have a telephone jack to connect to a fixed line telephone system. In this scenario, the base station 30 may communicate with the device 10 via DECT.

It will be appreciated by persons skilled in the art that numerous variations and/or modifications may be made to the invention as shown in the specific embodiments without departing from the scope or spirit of the invention as broadly described. The present embodiments are, therefore, to be considered in all respects illustrative and not restrictive.
WE CLAIM:

1. A multi-functional wireless device, comprising:
   a wireless transceiver to wirelessly communicate with another device;
   at least two speakers to reproduce stereophonic sound; and
   at least one microphone;
   wherein the wireless device is operable in at least two modes when in
   wireless communication with the other device, a first mode being a telephone
   handset using one of the at least two speakers and the at least one microphone
   such that the one of the at least two speakers is proximal to an ear of a user and
   the at least one microphone is proximal to the mouth of the user; and a second
   mode being a stereo loudspeaker using the at least two speakers.

2. The device according to claim 1, further comprising a conference call
   microphone to enable the wireless device to be used for a conference call.

3. The device according to claim 1, further comprising a base station for
   charging the wireless device when the wireless device is docked with the base
   station.

4. The device according to claim 3, wherein the another device is a mobile
   device or a personal computer.

5. The device according to claim 4, wherein the base station includes a
   tractable tray for receiving the mobile device to charge the mobile device, the
   tractable tray sliding in and out from the base station.

6. The device according to claim 5, wherein the mobile device is a portable
   music player or mobile phone.

7. The device according to claim 1, wherein the wireless device wirelessly
   communicates with the other device using the Bluetooth™ protocol.

8. A communication system with music playback, the system comprising:
   a multi-functional wireless device including:
   a wireless transceiver to wirelessly communicate with another
   device;
at least two speakers to reproduce stereophonic sound; and
at least one microphone;
wherein the wireless device is operable in at least two modes
when in wireless communication with the another device, a first mode being a
telephone handset using one of the at least two speakers and the at least one
microphone; and a second mode being a stereo loudspeaker using the at least two
speakers; and

a base station for charging the wireless device when the wireless device is
docked with the base station.
**INTERNATIONAL SEARCH REPORT**

International application No.  
PCT/CN2010/079464

### A. CLASSIFICATION OF SUBJECT MATTER

According to International Patent Classification (IPC) or to both national classification and IPC

### B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

|IPC: H04M;H04B;H04R;H04W;H04Q|

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

PLEPODOC;CNPAT;CNKI: handset, speaker, microphone, stereo, mode, fashion, manner, first, second, wireless, mobile, portable, tiple, plurality, telephone, phone

### C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Further documents are listed in the continuation of Box C.  
See patent family annex.

* Special categories of cited documents:
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Name and mailing address of the ISA/CN  
The State Intellectual Property Office, the P.R.China  
6 Xitucheng Rd., Jimen Bridge, Haidian District, Beijing, China 10088  
facsimile No. 86-10-62019451

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SONG Limei  
Telephone No. (86-10)624133 26

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**INTERNATIONAL SEARCH REPORT**

Information on patent family members

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CONTINUATION OF CLASSIFICATION OF SUBJECT MATTER

H04M 1/60(2006.01)i
H04R 5/00(2006.01)j