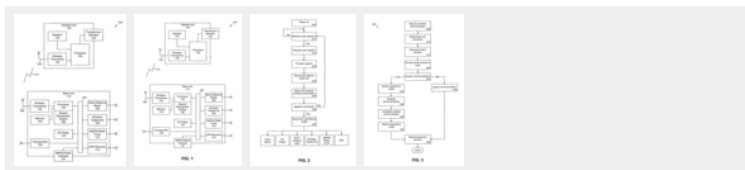


# Voice controlled multimedia and communications device

## Abstract

A portable multimedia and communications device can include a transductive element for receiving sound. The device also can include a base unit having a plurality of multimedia units and a processor executing a speech recognition engine for recognizing user speech. Each of the plurality of multimedia units can be selectively enabled and operated responsive to user voice commands received via the transductive element and communicated to the base unit via a communication link.

## Images (4)



## Classifications

■ **H04M1/6066** Portable telephones adapted for handsfree use involving the use of a headset accessory device connected to the portable telephone including a wireless connection  
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**US7072686B1**  
United States

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**Current Assignee:** Avon Assoc Inc

**Worldwide applications**  
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**Application US10/215,872 events** ©

- 2002-08-09 • Application filed by Avon Assoc Inc
- 2002-08-09 • Priority to US10/215,872
- 2002-08-09 • Assigned to AVON ASSOCIATES, INC. ©
- 2006-04-14 • Priority claimed from US11/279,836
- 2006-07-04 • Application granted
- 2006-07-04 • Publication of US7072686B1

**Status** • Active

2025-01-01 • Adjusted expiration

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## Claims (51)

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1. A portable multimedia and communications device comprising:
  - a transductive element for receiving sound; and
  - a base unit comprising a plurality of multimedia units and a processor executing a speech recognition engine for recognizing user speech, wherein each of said plurality of multimedia units can be selectively enabled and operated responsive to user voice commands received via said transductive element and communicated to said base unit via a communication link, wherein the base unit is a portable electronic device, wherein said plurality of multimedia units comprise at least one multimedia unit selected from the group consisting of an AM/FM radio, a cassette player, a compact disk player, and a digital software-based media player, and wherein said speech recognition engine is switched between a speaker-independent operational mode and a speaker-dependent operational mode responsive to a user spoken utterance.
2. The device of claim 1, wherein said transductive element is disposed in a first headset, said first headset unit further comprising a sound generation source and a short range wireless transceiver, said base unit comprising a second short range wireless transceiver for communicating with said short range wireless transceiver of said headset unit, and wherein said communication link is a wireless communication link.
3. The device of claim 1, wherein said device is voice activated, and wherein said plurality of multimedia units comprise a voice memo pad.
4. The device of claim 1, wherein responsive to activating one of said plurality of multimedia units, said processor disables another active one of said plurality of multimedia units.
5. The device of claim 4, wherein said processor disables said another active one of said plurality of multimedia units by lowering an audio volume of said another active multimedia unit.
6. The device of claim 4, wherein said processor disables said another active one of said plurality of multimedia units by pausing operation of said another active multimedia unit.
7. The device of claim 4, wherein responsive to terminating use of said activated multimedia unit, said processor re-enables said another active one of said plurality of multimedia units.
8. The device of claim 1, wherein one of said multimedia units is a wireless telephone.
9. The device of claim 8, wherein responsive to said wireless telephone receiving a telephone call, said processor disables an active one of said plurality of multimedia units.

12. The device of claim 9, wherein responsive to terminating said telephone call, said processor re-enables said active one of said plurality of multimedia units.
13. The device of claim 1, wherein a second one of said multimedia units is a short distance radio, and wherein plurality of multimedia units comprise an AM/FM radio interface.
14. The device of claim 13, wherein responsive to said short distance radio receiving a wireless communication, said processor disables an active one of said plurality of multimedia units.
15. The device of claim 14, wherein said processor disables an active one of said plurality of multimedia units by lowering an audio volume of said active multimedia unit.
16. The device of claim 14, wherein said processor disables an active one of said plurality of multimedia units by pausing operation of said active multimedia unit.
17. The device of claim 14, wherein responsive to terminating said wireless communication, said processor re-enables said active one of said plurality of multimedia units.
18. The device of claim 8, wherein a second one of said multimedia units is a global positioning (GPS) receiver.
19. The device of claim 8, wherein a second one of said multimedia units is an AM/FM radio tuner, and wherein a third one of said multimedia units is a digital software based media player.
20. The device of claim 8, wherein a second one of said multimedia units is an audio player.
21. The device of claim 20, wherein said audio player is selected from the group consisting of a compact disc player, a digital software-based media player, and a cassette player.
22. The device of claim 8, wherein a second one of said multimedia units is a voice recorder memo pad.
23. The device of claim 2, further comprising:  
at least a second headset unit configured similarly to said first headset unit, wherein said first headset unit and said second headset unit communicate with one another through said base unit via wireless communication links.
24. The device of claim 1, said base unit further comprising:  
an AM/FM radio interface for providing audio from said base unit to a radio.
25. The device of claim 1, said base unit further comprising:  
a transponder for locating said device.

**26. A method of operating a voice activated, portable multimedia and communications device comprising:**

receiving a user spoken utterance in a transductive element;

transmitting said user spoken utterance to a base unit via a communication link;

speech recognizing said user spoken utterance as a valid voice command;

selectively enabling one of a plurality of multimedia units disposed in said base unit responsive to identifying said user spoken utterance as said valid voice command, wherein the base unit is a portable electronic device, and wherein said plurality of multimedia units comprise at least one multimedia unit selected from the group consisting of an AM/FM radio, a cassette player, a compact disk player, and a digital software-based media player; and

switching a selectively-enabled multimedia unit between a speaker-independent operational mode and a speaker-dependent operational mode in response to a user spoken utterance identified as a valid voice command.

27. The method of claim 26, wherein said transductive element is disposed in a headset unit.
28. The method of claim 26, wherein said user spoken utterance is transmitted to a base unit via a short distance wireless communications link.
29. The method of claim 26, further comprising:  
activating one of said plurality of multimedia units;  
responsive to said activating steps disabling another active one of said plurality of multimedia units.
30. The method of claim 29, said disabling step comprising:  
lowering an audio volume of said another active multimedia unit.
31. The method of claim 29, said disabling step comprising:  
pausing operation of said another active multimedia unit.
32. The method of claim 29, further comprising:  
responsive to terminating use of said activated one of said plurality of multimedia units, re-enabling said another active one of said plurality of multimedia units.
33. The method of claim 26, wherein said voice command activates an intercom operational mode, said method further comprising:  
receiving a subsequent user spoken utterance in said base unit from said headset unit via a wireless communication link; and  
forwarding said user spoken utterance to a second headset unit via a second wireless communication link.
34. The method of claim 26, wherein one of said plurality of multimedia units is a wireless telephone, said method further comprising:  
receiving a telephone call in said wireless telephone; and

36. The method of claim 34, wherein said audio notification plays a calling telephone number of said received call.
37. The method of claim 26, wherein another one of said plurality of multimedia units is active when said telephone call is received, said method further comprising:  
responsive to receiving said telephone call, disabling said active one of said plurality of multimedia units.
38. The method of claim 37, said disabling step comprising:  
lowering an audio volume of said active multimedia unit.
39. The method of claim 37, said disabling step comprising:  
pausing operation of said active multimedia unit.
40. The method of claim 37, further comprising:  
responsive to terminating said telephone call, re-enabling said active one of said plurality of multimedia units.
41. The method of claim 34, wherein said audio notification queries a user whether to answer said received telephone call.
42. The method of claim 34, further comprising:  
determining that a calling number for said received telephone call is not included in a contact list; and  
querying a user whether to save said received call information.
43. The method of claim 26, wherein one of said plurality of multimedia units is a short distance radio, said method further comprising:  
receiving a short distance radio communication in said short distance radio; and  
providing an audio notification to said headset unit indicating that said short distance radio communication has been received.
44. The method of claim 43, wherein another one of said plurality of multimedia units is active when said short distance radio communication is received, said method further comprising:  
responsive to receiving said short distance radio communication, disabling said active one of said plurality of multimedia units.
45. The method of claim 44, said disabling step comprising:  
lowering an audio volume of said active multimedia unit.
46. The method of claim 44, said disabling step comprising:  
pausing operation of said active multimedia unit.
47. The method of claim 44, further comprising:  
responsive to terminating said short distance radio communication, re-enabling said active one of said plurality of multimedia units.
48. The method of claim 43, wherein said audio notification queries a user whether to answer said received short distance radio communication.
49. The method of claim 26, wherein one of said plurality of multimedia units is a wireless telephone and another one of said plurality of multimedia units is a short distance radio, said method further comprising:  
exchanging audio between said wireless telephone and said short distance radio.
50. A portable multimedia and communications device comprising:  
a transductive element for receiving sound; and  
a base unit comprising a plurality of multimedia units and a processor executing a speech recognition engine for recognizing user speech, wherein each of said plurality of multimedia units can be selectively enabled and operated responsive to user voice commands received via said transductive element and communicated to said base unit via a communication link, wherein the base unit is a portable electronic device, wherein said plurality of multimedia units comprise at least one multimedia unit selected from the group consisting of an AM/FM radio, a cassette player, a compact disk player, and a digital software-based media player, and wherein each multimedia unit operates in a speaker-dependent operational mode until being switched to a speaker-independent operational mode in response to a user spoken utterance.
51. A method of operating a voice activated, portable multimedia and communications device comprising:  
receiving a user spoken utterance in a transductive element;  
transmitting said user spoken utterance to a base unit via a communication link;  
speech recognizing said user spoken utterance as a valid voice command;  
selectively enabling one of a plurality of multimedia units disposed in said base unit responsive to identifying said user spoken utterance as said valid voice command, wherein the base unit is a portable electronic device, and wherein said plurality of multimedia units comprise at least one multimedia units selected from the group consisting of an AM/FM radio, a cassette player, a compact disk player, and a digital software-based media player; and  
operating a selectively-enabled multimedia unit in a speaker-dependent operational mode until causing the selectively-enable multimedia unit to operate in a speaker-independent mode in response to a user spoken utterance identified as a valid voice command.

#### Description

The present invention relates the field of portable communications devices.

## 2. Description of the Related Art

As consumers continue to demand mobile access to many computing and communications services, technology continues to evolve to accommodate consumer demand. Ideally, consumers prefer to have access to most, if not all, of the same computing functions presently available at home or the office despite being away from such resources. In response to consumer demand, a wide variety of portable electronic devices have become commercially available. For example, individuals can track and store a variety of personal information using conventional personal digital assistants, communicate with friends, family, and business contacts using cellular telephones, and listen to music through portable radios, compact disc (CD) players, and/or Motion Picture. Experts Group-1 Audio Layer 3 (MP3) players. A variety of other portable devices such as portable short distance radios and global positioning system (GPS) receivers are available to consumers as well.

The majority of commercially available portable devices are sold as single function units. That is, the consumer typically must purchase a music player separately from a cellular telephone, or a citizen band radio separately from a GPS receiver. Typically, consumers must carry a plethora of electronic devices should the consumer wish to travel with calendaring, music, communications, and the like. Even in cases where one or more of these devices are available in various combinations within a single unit, frequently, no single combination device is able to meet the consumer's full range of needs.

Although each device may not be burdensome to operate alone, when used in combination with one or more other devices, the consumer can be overwhelmed with connections, wires, cables, and attachments. To better organize the various electronic devices a consumer may carry, several varieties of carry-alls or electronic device organizers are available. Still, as the benefit of using a portable electronic device is the immediacy and ease with which the different functions of the device can be accessed, storing the device in a carry-all may not prove to be convenient. For example, by the time a consumer is able to locate a ringing cellular telephone within a carry-all, the call may be missed. By the time one finds a personal digital assistant within a carry-all, the opportunity to use the sought after information may have passed.

Assuming that a consumer is able to carry each of the various portable electronic devices that the consumer needs or desires, the consumer still must have one or more hands free in order to operate any given device. With respect to travelers, however, this is not often the case. More than likely, travelers use one or both hands to carry luggage, a carry-on bag, or possibly a personal digital assistant. To operate any of the traveler's portable electronic devices, the traveler may have to stop, put down one or more bags, search for the device, and only then proceed to use the desired device.

Other users, for example individuals who enjoy walking, jogging, hiking, bicycling, motorcycling, boating, or other activities, also rely upon portable electronic devices such as GPS units, music players, cellular telephones, voice memo pads, and the like when engaged in sports or other outdoor activities. Such individuals, however, not only must have one or more free hands to operate a given device, but also must be able to divert their attention away from an ongoing activity to operate the device. For example, the user typically must watch a dial or display as a radio is tuned, as a volume is adjusted, and the like. The use of ones eyes and hands, however, can cause a break in rhythm and concentration and may even cause an accident.

## SUMMARY OF THE INVENTION

The present invention provides a solution for persons requiring access to a variety of multimedia, communications, and computing functions from a single electronic device. In particular, the present invention provides a portable electronic device which can include one or more of an AM/FM radio, a music player, a short distance radio, a voice memo pad, a cellular telephone, a global positioning system (GPS) receiver, an AM/FM radio interface, and a transponder (hereafter collectively referred to as "multimedia units"). Importantly, each of the various multimedia units not only can be included within a single, portable device, but also can be operated in a hands-free manner through the use of voice commands and speech recognition technology. Although the device can be embodied in a variety of forms, according to one inventive arrangement, the device can be modular, wearable, and weather resistant.

One aspect of the present invention can include a portable multimedia and communications device. The device can include a transductive element for receiving sound. According to one arrangement, the transductive element can be disposed in a first headset unit which can include a sound generation source and a short range wireless transceiver. The device also can include a base unit having a plurality of multimedia units and a processor executing a speech recognition engine for recognizing user speech. Notably, the speech recognition engine can be switched between a speaker-independent operational mode and a speaker-dependent operational mode responsive to a control signal, for example a user spoken utterance.

The device can be voice enabled such that each of the multimedia units can be selectively enabled and operated responsive to user voice commands received via the transductive element and communicated to the base unit via a communication link. Notably, the base unit can include a second short range wireless transceiver for communicating with the short range wireless transceiver of the headset unit. Accordingly, the communication link can be a wireless communication link. Still, the transductive element, or the headset unit depending upon the particular embodiment of the present invention, can be connected to the base unit via a wired connection.

According to one aspect of the present invention, responsive to activating one of the plurality of multimedia units, the processor can disable another active one of the plurality of multimedia units by lowering an audio volume of the other active multimedia unit or pausing operation of the other active multimedia unit. Responsive to terminating use of the activated multimedia unit, the processor can re-enable the other active one of the plurality of multimedia units.

For example, one of the multimedia units can be a wireless telephone. Thus, responsive to the wireless telephone receiving a telephone call, the processor can disable an active one of the multimedia units. For instance, the processor can disable an active multimedia unit by lowering an audio volume of the active multimedia unit or by pausing operation of the active multimedia unit. Responsive to termination of the telephone call, the processor can re-enable the active multimedia unit.

Taking another example, a second one of the multimedia units can be a short distance radio. In that case, responsive to the short distance radio receiving a wireless communication, the processor can disable an active one of the multimedia units. The processor can disable an active multimedia unit by lowering an audio volume of the active multimedia unit or by pausing operation of the active multimedia unit. Responsive to termination of the wireless communication, the processor can re-enable the active multimedia unit.

Still, the present invention can include additional multimedia units. For example, the present invention can include, but is not limited to, multimedia units such as a GPS receiver, an AM/FM radio tuner, an audio player, a compact disc player, a digital software-based media player, a cassette player, a voice recorder memo pad, an AM/FM radio interface, and a transponder.

Another embodiment of the present invention can include at least a second headset unit configured similarly to the first headset unit. The first headset unit and the second headset unit can communicate with one another through the base unit via wireless communication links.

Another aspect of the present invention can include a method of operating a voice activated, portable multimedia and communications device. The method can include receiving a user spoken utterance in a transductive element. The transductive element can be included within a headset unit. The user spoken utterance can be transmitted to a base unit via a wired connection or a short distance wireless communication link. The user spoken utterance can be speech recognized as a valid voice command. Accordingly, one of the multimedia units disposed in the base unit can be selectively enabled responsive to identifying the user spoken utterance as a valid voice command. Notably, the method can include switching between a speaker-independent operational mode and a speaker-dependent operational mode responsive to a control signal such as a voice command.

The method can include activating one of the plurality of multimedia units, and responsive to the activating step, disabling another active one of the plurality of

According to one embodiment of the present invention, the voice command can activate an intercom operational mode. In that case, the method can include receiving a subsequent user spoken utterance in the base unit from the headset unit via a wireless communication link. The user spoken utterance can be forwarded to a second headset unit via a second wireless communication link.

Still, one of the multimedia units can be a wireless telephone. Accordingly, the method can include receiving a telephone call in the wireless telephone and playing an audio notification through the headset unit indicating that the call has been received. For example, the audio notification can play a name associated with the received telephone call or a calling telephone number of the received call. Notably, the audio notification can query the user whether to answer the received telephone call. If another one of the multimedia units is active when the telephone call is received, the method further can include, responsive to receiving the telephone call, disabling the active multimedia unit. The active multimedia unit can be disabled by lowering an audio volume of the active multimedia unit or by pausing operation of the active multimedia unit. Responsive to terminating the telephone call, the active multimedia unit can be re-enabled. The method also can include determining that a calling number for the received telephone call is not included in a contact list and querying a user whether to save the received call information.

According to another embodiment of the present invention, one of the multimedia units can be a short distance radio. In that case the method can include receiving a short distance radio communication in the short distance radio and providing an audio notification to the headset unit indicating that the short distance radio communication has been received. For example, the user can be queried as to whether the received short distance radio communication should be answered. If another one of the multimedia units is active when the short distance radio communication is received, the method also can include, responsive to receiving the short distance radio communication, disabling the active multimedia unit. For example, the active multimedia unit can be disabled by lowering an audio volume of the active multimedia unit or by pausing operation of the active multimedia unit. Responsive to terminating the short distance radio communication, the active multimedia unit can be re-enabled. Notably, if one of the plurality of multimedia units is a wireless telephone and another one of the plurality of multimedia units is a short distance radio, the method can include exchanging audio between the wireless telephone and the short distance radio.

#### BRIEF DESCRIPTION OF THE DRAWINGS

There are shown in the drawings embodiments which are presently preferred, it being understood, however, that the invention is not limited to the precise arrangements and instrumentalities shown.

FIG. 1 is a schematic diagram illustrating a voice-controlled multimedia and communications device in accordance with the inventive arrangements disclosed herein.

FIG. 2 is a flow chart illustrating a method of communicating between the headset unit and the base unit of the voice-controlled multimedia and communications device of FIG. 1.

FIG. 3 is a flow chart illustrating a method of receiving and processing wireless communications in accordance with the present invention.

#### DESCRIPTION OF THE INVENTION

The present invention provides a solution for persons requiring hands-free control over a variety of multimedia, communications, and computing functions contained within a single electronic device. In particular, the present invention provides a portable electronic device which can include one or more of an AM/FM radio, a music player, a short distance radio, a voice memo pad, a cellular telephone, a global positioning system (GPS) receiver, an AM/FM radio interface, and a transponder (hereafter collectively referred to as "multimedia units"). Importantly, each of the various multimedia units can be operated in a hands-free manner through the use of voice commands. Although the device can be embodied in a variety of forms, according to one inventive arrangement, the device can be modular, wearable, and weather resistant.

FIG. 1 is a schematic diagram illustrating a voice-controlled multimedia and communications device (VCMCD) **100** in accordance with the inventive arrangements disclosed herein. As shown, the VCMCD **100** can include two primary components, a headset unit **105** and a base unit **110**. The headset unit **105** and the base unit **110** can communicate with one another via a wireless communication link **115**. The headset unit **105** can include a speaker **120** or other sound generator, a transductive element **125**, a processor **130**, a wireless transceiver **135**, and an antenna **140**. The speaker **120** can be disposed in an earpiece portion of the headset unit **105** to provide audio output when the headset **105** is worn by a user. Although not shown in FIG. 1, the headset unit **105** can include additional speakers so as to provide stereo sound. Accordingly, the headset can include two earpiece portions, each having a speaker disposed therein.

The transductive element **125**, for example a microphone, can be attached to the headset unit **105**. For example, according to one embodiment of the present invention, the transductive element **125** can be located on an arm which is rotatably attached to the earpiece so as to swing up and away from a user's face when not in use. Still, the transductive element **125** can be attached to the headset in any of a variety of different forms. For instance, the transductive element can be disposed within a clip-on apparatus which can clip onto a user's clothing. In that case, the transductive element **125** can be communicatively linked to the headset unit **105** via a wired connection. In the event the transductive element **125** is located as a separate component from the headset unit **105**, the transductive element **125** can be communicatively linked to the base unit **110** via a wireless or wired connection.

Continuing with FIG. 1, the speaker **120** and the transductive element **125** can be communicatively linked to the processor **130**. The processor **130** can perform a variety of audio processing and routing functions, as well as serve as an interface between the speaker **120**, the transductive element **125**, and the wireless transceiver **135**. In particular, the processor **130** can perform analog-to-digital (A/D) conversions of audio signals received from the transductive element **125** and perform digital-to-analog (D/A) conversions of audio so as to provide a suitable audio signal to the speaker **120**.

As mentioned, the processor **130** further can route signals among the various components of the headset unit **105**. In particular, the processor **130** can receive audio signals, control signals, and other data originating from the base unit **110** through the wireless transceiver **135**. The processor **130** can separate audio signals from the various control signals, D/A convert the audio, and provide the audio to the speaker **120**. Similarly, the processor **130** can A/D convert audio signals received from the transductive element **125**, and provide the converted audio in addition to any control signals and data to the wireless transceiver **135** for transmission to the base unit **110**.

It should be appreciated that the processor **130**, although depicted as a single general purpose processor, can be embodied as one or more processors, including control processors and audio processors such as digital signal processing (DSP) units. The speaker **120** and the transductive element **125** can be communicatively linked to the processor **130** via suitable circuitry. The processor **130** and the wireless transceiver **135** also can be communicatively linked via circuitry, for example a communications bus capable of supporting two way communications.

The wireless transceiver **135** can serve as an interface to the base unit **110**. Specifically, the wireless transceiver **135** can receive signals from the processor **130** and convert the signals for use with a suitable wireless communications protocol for transmission. Similarly, the wireless transceiver **135** can receive signals from the base unit **110** and decode the signals using an appropriate wireless communications protocol prior to forwarding the signals to the processor **130**.

The wireless transceiver **135** can be embodied in a variety of forms. For example, the wireless transceiver **135** can be configured to communicate with the base unit **110** using sound waves or infrared light. According to one embodiment of the invention, however, radio waves, that is radio frequency (RF) communication can be used. Thus, the wireless transceiver **135** can provide a signal to antenna **140** for transmission to the base unit **110**. The wireless transceiver **135** can be configured to communicate with the base unit **110** using any of a variety of short range wireless technologies and/or protocols. For example, the wireless transceiver **135** can utilize BLUETOOTH technology, another technology of the 802.11 family of wireless communication specifications, as well as other proprietary technologies.

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