

MULTIFUNCTIONAL PORTABLE BLUETOOTH SPEAKER

FIELD OF THE INVENTION

[0001] The present invention relates to a Bluetooth Speaker. More particularly, the present invention relates to a multifunctional portable Bluetooth speaker which is portable, water-proof, and capable of sing-along on music streaming platforms.

BACKGROUND OF THE INVENTION

[0002] Music is the energy that activates the soul. Singing is an activity in which people enjoy music. Therefore, if beautiful music is heard around our life, human beings will instinctively echo or dance with it, at least the mood will be lifted by it. Generally speaking, in addition to the musical instruments, music can also be listened to by playing the pre-stored music files through speakers. With the advancement of technology, the size of the speakers is getting smaller and smaller, which is convenient for people to carry them around and enjoy music anywhere by connecting to music sources via Bluetooth. The play effect of these compact speakers is no less than that of traditional floor-standing speakers.

[0003] However, there are further wishes for people: having these speakers have the karaoke accompaniment function. In this regard, there are many challenges to upgrading existing speakers to this specification. First of all, the speakers must be able to connect with the radio equipment, such as a microphone. Second, the speakers must also be able to add vocals when connected to a music source. Finally, the speakers also have the function of outputting the synthesized music to the outside and storing the synthesized music in other media. In addition to the improvement of the internal electronics and mechanics of the speakers, for their appearance and use, it is best to have a temporary fixation and waterproof design.

[0004] Although the above requirements for speaker improvement are reasonable and feasible, due to the limitations of various transmission specifications and connection interfaces, there is currently no product that fully meets the requirements on the market.

SUMMARY OF THE INVENTION

[0005] This paragraph extracts and compiles some features of the present invention; other features will be disclosed in the follow-up paragraphs. It is intended to cover various modifications and similar arrangements included within the spirit and scope of the appended claims.

[0006] In order to meet the aforementioned needs, a multifunctional portable Bluetooth speaker is disclosed. It comprises: a microphone, having a microphone end U-band communication module, transmitting a voice signal converted from received sound; a speaker body, comprising: a shell structure, appearance thereof close to a circle viewed from the top, comprising: a lower shell, having a microphone accommodating slot formed inside to accommodate the microphone, wherein an open end of the microphone accommodating slot is formed on a sidewall of the lower shell, and a plurality of operating buttons and a speaker end USB slot are installed on the sidewall; a top cover, connected to the lower shell, wherein two openings are formed on the top of the top cover; and a sound transparent perforated cover, installed above the top cover, covering the two openings; a medium and low frequency speaker, installed inside the lower shell, facing one of the two openings; a high frequency speaker, installed inside the lower shell, facing the other one of the two openings; a speaker end Bluetooth communication module, installed inside the lower shell, capable of signal connection to a plurality of external Bluetooth devices to receive music signals; a speaker end U-band communication module, installed inside the lower shell and wirelessly connected with the microphone end U-band communication module, receiving the voice signal; a speaker end power module, installed inside the lower shell, electrically connected to the medium and low frequency speaker, the high frequency speaker, the speaker end Bluetooth communication module and the speaker end U-band communication module, transmitting power to electrically connected elements and storing external power from the speaker end USB slot; and a speaker end control module, installed inside the lower shell, switchably and electrically connected to the speaker end power module, and signally connected to the speaker end Bluetooth communication module, the speaker end U-band communication module, the medium and low frequency speaker, the high frequency speaker, the speaker end USB slot and the operating buttons, executing following operations: turning on or turning off

by a first operating button; controlling the speaker end Bluetooth communication module to be signally connected to any one of the external Bluetooth devices, and playing or pausing playback actual sound corresponding to a transmitted music signal from the connected external Bluetooth devices and / or the voice signal through the medium and low frequency speaker and the high frequency speaker by a second operating button; and removing or restoring a vocal part of the music signal by a third operating button; and a waterproof silicone cover, covering the shell structure except the sound transparent perforated cover, wherein a plurality of suckers on the bottom of the waterproof silicone cover are used to removably fix the speaker body on a plane, and a side of the waterproof silicone cover has a first openable cover formed corresponding to the speaker end USB slot and a second openable cover formed corresponding to the open end.

[0007] According to the present invention, two nuts may be installed on two opposite positions of the lower shell, respectively, each nut goes through a through hole correspondingly formed on the waterproof silicone cover, and a carry strap with perforations at both ends is rotatably connected to the speaker body by passing each nut through one of the perforations and securing the nut with a screw.

[0008] According to the present invention, a speaker end audio receiving jack may be further installed on the sidewall of the lower shell further, and the speaker end audio receiving jack and the speaker end control module are signally connected, so that the speaker end control module plays or pauses playback an actual music corresponding to a music signal transmitted from an audio plug plugged in the speaker end audio receiving jack through the medium and low frequency speaker and the high frequency speaker.

[0009] According to the present invention, a fixing hook may be further installed on the bottom of the case, an elastic hook corresponding to the fixing hook is further installed inside a close end of the microphone accommodating slot, and when the microphone is inserted into the microphone accommodating slot, the elastic hook hooks the fixing hook; when the microphone is further pressed, the elastic hook releases the fixing hook and pops up the microphone.

[0010] According to the present invention, the microphone may further comprise: a case, wherein a plurality of open ends are formed on top of the case, a porous metal

case is fixed in the open ends, a plurality of control buttons are fixed on the side of the case, and a microphone end USB slot is installed on the bottom of the case; a radio module, installed in the case, converting an external sound into the voice signal through the porous metal case; a microphone end Bluetooth communication module, installed in the case, capable of signally connecting to the external Bluetooth devices; a microphone end power module, installed in the case and electrically connected to the microphone end U-band communication module, the microphone end Bluetooth communication module and the radio module, transmitting power to electrically connected components and storing external power from the microphone end USB slot; and a microphone end control module, installed in the case, switchably and electrically connected to the microphone end power module, and signally connected with the microphone end Bluetooth communication module, the microphone end U-band communication module, the radio module, the microphone end USB slot, and the control buttons, executing following operations: turning on or turning off by a first control button; increasing the volume of the voice signal by a second control button; reducing the volume of the voice signal by a third control button; increasing the echo effect of the voice signal by a fourth control button; and reducing the echo effect of the voice signal by a fifth control button.

[0011] According to the present invention, a microphone end audio transceiver jack and a microphone end audio receiving jack may be further installed on the bottom of the case, signally connected with the microphone end control module, and capable of connecting to an earphone audio plug, respectively, when the earphone audio plug is plugged into the microphone end audio transceiver jack, the microphone end control module transmits the voice signal externally through the earphone audio plug or receives the music signal from the earphone audio plug, and when the earphone audio plug is plugged into the microphone end audio receiving jack, the microphone end control module transmits the voice signal and / or received music signal externally through the earphone audio plug.

[0012] According to the present invention, a slide key may be further installed on the side of the case and signally connected with the microphone end control module, when the slide key slides to a first end, the microphone end control module turns on the microphone end U-band communication module and cuts off signal transmission between

the microphone end audio transceiver jack and the microphone end audio receiving jack, and when the slide key slides to a second end, the microphone end control module turns off the microphone end U-band communication module and restores signal transmission between the microphone end audio transceiver jack and the microphone end audio receiving jack.

[0013] According to the present invention, the speaker end control module may be set as one of a master or a slave, and when two speaker bodies are signally connected through their speaker end Bluetooth communication modules, the speaker end control module set as the master sends the music signal unidirectionally to the speaker end control module set as the slave.

[0014] According to the present invention, a USB charging plug may be further installed on a close end of the microphone accommodating slot, an indicator is further installed on the sidewall of the lower shell, the USB charging plug and the indicator are electrically connected to the speaker end power module, and when the microphone is placed in the microphone accommodating slot and the microphone end USB slot is electrically connected to the USB charging plug, the speaker end power module charges the microphone and the indicator lights up.

[0015] Preferably, the speaker end control module and the microphone end control module conform to the USB-OTG specification, so that both of the speaker end USB slot and the microphone end USB slot are capable of receiving the music signal transmitted from a plugged USB plug and transmitting the voice signal to the USB plug.

[0016] In the present invention, through the transmission of several audio source signals and the design of the waterproof silicone cover, the speaker body can not only play music directly, but also provides synchronized vocals and music play through the microphone with waterproof function. The user's singing voice can be recorded in the cloud through the device connected with the Bluetooth module, or broadcast live.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] Fig. 1 is an appearance drawing of a multifunctional portable Bluetooth speaker according to an embodiment of the present invention.

[0018] Fig. 2 is a side view of a microphone.

- [0019]** Fig. 3 is a bottom view of the microphone.
- [0020]** Fig. 4 is a circuit block diagram of the microphone.
- [0021]** Fig. 5 is an exploded diagram of a shell structure of a speaker body.
- [0022]** Fig. 6 to Fig. 8 are different appearance drawings of a lower shell of the shell structure.
- [0023]** Fig. 9 is a circuit diagram of internal electronic components of the speaker body.
- [0024]** Fig. 10 illustrates the state when the waterproof silicone cover is removed from the speaker body.
- [0025]** Fig. 11 illustrates the state when a carry strap on the speaker body is removed.
- [0026]** Fig. 12 illustrates an application aspect of the present invention.
- [0027]** Fig. 13 illustrates another application aspect of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0028] The present invention will now be described more specifically with reference to the following embodiments.

[0029] See Fig. 1. It is an appearance drawing of a multifunctional portable Bluetooth speaker 1 according to an embodiment of the present invention. Technical elements of the multifunctional portable Bluetooth speaker 1 includes a microphone 10, a speaker body 20 and a waterproof silicone cover 30. The structure and function of each technical element are described below in conjunction with the relevant drawings.

[0030] The microphone 10 is a technical element signally connected to the speaker body 20 that a user can operate it to make sound over the speaker body 20. See Fig. 2 to Fig. 4. Fig. 2 is a side view of the microphone 10. Fig. 3 is a bottom view of the microphone 10. Fig. 4 is a circuit block diagram of the microphone 10. The microphone 10 includes a case 11, a radio module 12, a microphone end U-band communication module 13, a microphone end Bluetooth communication module 14, a microphone end power module 15 and a microphone end control module 16. The case 11 is used to cover and protect the electronic materials inside it and is used for the user to hold and operate.

A number of open ends 111 are formed on top of the case 11. A porous metal case 112 is fixed in the open ends 111. A number of control buttons are fixed on the side of the case 11. In the present embodiment, there are a first control button 1131, a second control button 1132, a third control button 1133, a fourth control button 1134 and a fifth control button 1135. Operate each control button to turn on and off the microphone 10, or adjust the electrical signal transmitted by the microphone 10. This will be illustrated below. A slide key 1136 is installed below the control buttons and on the side of the case 11. The slide key 1136 can switch back and forth between a first end 11361 and a second end 11362, so that the microphone 10 can use different signal transmission methods. A microphone end USB slot 114, a fixing hook 115, a microphone end audio transceiver jack 116 and a microphone end audio receiving jack 117 are installed on the bottom of the case 11. The microphone end USB slot 114 is a USB Type-C slot, capable of plugging USB Type-C plug. The microphone end audio transceiver jack 116 and the microphone end audio receiving jack 117 are both 3.5 audio holes. The difference is that under the operation of the controlled circuit, the former can receive external music signals (may be digital or analog) and transmit music signals to the outside while the latter can only unidirectionally transmit of music signal to the outside.

[0031] The case 11 includes more than one circuit board and many fixing ribs (not shown). There are many active and passive components on the circuit board, some of which can provide specific functions. Collections of these components are called modules. Some of the modules will be signally connected to and controlled by the components on the case 11. Please see Fig. 4. The radio module 12 is installed in the case 11, converting an external sound into a voice signal through the porous metal case 112. In practice, the radio module 12 may be a radio unit, capable of converting the vibration waveform of the sound into the corresponding electrical signal, i.e., the voice signal. The electrical signals can be digital or analog. In use, the voice of the user speaking or singing is received by the radio module 12 for subsequent processing. The microphone end U-band communication module 13 is used to transmit a voice signal converted from received sound. The transmission object is the U-band communication module in the speaker body 20. U-band is Ultra High Frequency (UHF). Signal frequency varies from 300MHz to 3GHz. In use, the voice signal is unidirectionally transmitted. The

microphone end Bluetooth communication module 14 is also installed in the case 11, capable of signally connecting to a number of external Bluetooth devices. According to the requirement of the present invention, the external Bluetooth device is an electronic device that can be connected to video streaming websites, live streaming websites or karaoke websites, and has a Bluetooth communication module to signally connect with the microphone end Bluetooth communication module 14. The external Bluetooth device may be but is not limited to a smartphone, a tablet, a desktop or a laptop.

[0032] The microphone end power module 15 is installed in the case 11 and electrically connected to the microphone end U-band communication module 13, the microphone end Bluetooth communication module 14 and the radio module 12, transmitting power to electrically connected components. In practice, the microphone end power module 15 includes at least one secondary battery. The manner in which the electrical connections are described in the drawings is represented by thick solid lines, as opposed to the bold dashed lines representing signal connections through connecting lines. In addition, the microphone end power module 15 is also electrically connected to the microphone end USB slot 114. But unlike other electrically connected elements, the microphone end power module 15 receives external power from the microphone end USB slot 114 and store the external power. Namely, the microphone end USB slot 114 is a power supply of the microphone end power module 15.

[0033] The microphone end control module 16 is the main component for the operation of the microphone 10. The microphone end control module 16 is installed in the case 11 and switchably and electrically connected to the microphone end power module 15. The microphone end control module 16 is also signally connected with the microphone end Bluetooth communication module 14, the microphone end U-band communication module 13, the radio module 12, the microphone end USB slot 114, the control buttons, the slide key 1136, the microphone end audio transceiver jack 116 and the microphone end audio receiving jack 117. The microphone end control module 16 can execute some operations. First, the microphone end control module 16 turns on or turns off by a first control button 1131, further turning on or turning off the microphone 10. Since it is about the operation of the microphone 10, preferably, the first control button 1131 will be turned on or off after being pressed for a long time, for example, three

seconds. Secondly, increase the volume of the voice signal by a second control button 1132 (being pressed for a short time), further, to control the speaker body 20 to increase the volume of the sound corresponding to the voice signal. Thirdly, reducing the volume of the voice signal by a third control button 1133 (being pressed for a short time), further, to control the speaker body 20 to reduce the volume of the sound corresponding to the voice signal. Fourthly, increase the echo effect of the voice signal by a fourth control button 1134 (being pressed for a short time). Fifthly, reduce the echo effect of the voice signal by a fifth control button 1135 (being pressed for a short time). Sixthly, When the slide key 1136 slides to the first end 11361, the microphone end control module 16 turns on the microphone end U-band communication module 13 and cuts off signal transmission between the microphone end audio transceiver jack 116 and the microphone end audio receiving jack 117. When the slide key 1136 slides to the second end 11362, the microphone end control module 16 turns off the microphone end U-band communication module 13 and restores signal transmission between the microphone end audio transceiver jack 116 and the microphone end audio receiving jack 117. In other words, when the slide key 1136 is at the first end 11361, the microphone 10 and the speaker body 20 are connected by wireless signals through the ultra-high frequency band. When the slide key 1136 is at the second end 11362, the microphone 10 and the speaker body 20 are connected by wired signals through the signal lines. In addition to the above operations of external interactions, the microphone end control module 16 also manage basic preset functions of the microphone end Bluetooth communication module 14, the microphone end U-band communication module 13 and the radio module 12.

[0034] Further, the microphone end audio transceiver jack 116 and the microphone end audio receiving jack 117 are capable of connecting to an earphone audio plug (not shown), respectively. In practice, the earphone audio plug is a 3.5 audio connector. When the earphone audio plug is plugged into the microphone end audio transceiver jack 116, the microphone end control module 16 transmits the voice signal externally through the earphone audio plug or receives the music signal (from the source of music, such as a smartphone) from the earphone audio plug. When the earphone audio plug is plugged into the microphone end audio receiving jack 117, the microphone end

control module 16 transmits the voice signal and / or received music signal externally through the earphone audio plug.

[0035] See Fig. 5 to Fig. 9. Fig. 5 is an exploded diagram of a shell structure 21 of the speaker body 20. Fig. 6 to Fig. 8 are different appearance drawings of a lower shell 211 of the shell structure 21. Fig. 9 is a circuit diagram of internal electronic components of the speaker body 20. The speaker body 20 includes the shell structure 21, a medium and low frequency speaker 22, a high frequency speaker 23, a speaker end Bluetooth communication module 24, a speaker end U-band communication module 25, a speaker end power module 26 and a speaker end control module 27. As shown in Fig. 5, appearance of the shell structure 21 is close to a circle viewed from the top. It is used to protect the components inside and to facilitate the sound from the speaker to pass through to the outside. The shell structure 21 includes the lower shell 211, a top cover 212 and a sound transparent perforated cover 213. A microphone accommodating slot 2111 is formed inside the lower shell 211 to accommodate the microphone 10. As shown in Fig. 7, an open end 21111 of the microphone accommodating slot 2111 is formed on a sidewall of the lower shell 211 and used to let the microphone 10 enter the microphone accommodating slot 2111. A number of operating buttons, a speaker end USB slot 2112, an indicator 2116 and a speaker end audio receiving jack 2117 are installed on the sidewall. In the present embodiment, there are three operating buttons: a first control button 2113, a second control button 2114 and a third control button 2115.

[0036] The top cover 212 is connected to the lower shell 211. Two openings are formed on the top of the top cover 212: a first opening 2121 and a second opening 2122. The first opening 2121 is larger and a grid can be set on it. A purpose of the first opening 2121 and the second opening 2122 is to let the sound of the speakers spread from the top cover 212. The sound transparent perforated cover 213 is installed above the top cover 212 and cover the two openings. Its purpose is to protect the openings, but not hinder the transmission of sound (through the opening).

[0037] The medium and low frequency speaker 22 is installed inside the lower shell 211, facing the first opening 2121. The high frequency speaker 23 is also installed inside the lower shell 211, facing the second opening 2122.

[0038] The shell structure 21 has a circuit board 2118 inside. Like the microphone 10, the circuit board 2118 gathers many active and passive components on it. Collections of the components provide specific functionality, and collections of these components are called modules. The circuit board 2118 includes the speaker end Bluetooth communication module 24, the speaker end U-band communication module 25, the speaker end power module 26 and the speaker end control module 27. The components these modules interact with are depicted in Fig. 8. The speaker end Bluetooth communication module 24 is installed inside the lower shell 211 and capable of signal connection to a number of external Bluetooth devices (connection is the same as the microphone 10) to receive music signals. The speaker end U-band communication module 25 is installed inside the lower shell 211 and wirelessly connected with the microphone end U-band communication module 13, for receiving the voice signal from the microphone end U-band communication module 13. The speaker end power module 26 is electrically connected to the medium and low frequency speaker 22, the high frequency speaker 23, the speaker end Bluetooth communication module 24 and the speaker end U-band communication module 25, to transmit power to electrically connected elements. The speaker end power module 26 is also electrically connected to the speaker end USB slot 2112. However, unlike other electrically connected components, the speaker end power module 26 receives external power from the speaker end USB slot 2112 and store the external power. Namely, the speaker end USB slot 2112 is a power supply of the speaker end power module 26. In practice, the speaker end power module 26 is also a storage and discharge component using a secondary battery. The speaker end control module 27 is the main component for the operation of the speaker body 20. The speaker end control module 27 is switchably and electrically connected to the speaker end power module 26, and signally connected to the speaker end Bluetooth communication module 24, the speaker end U-band communication module 25, the medium and low frequency speaker 22, the high frequency speaker 23, the speaker end USB slot 2112 and the operating buttons, executing following operations. First, the speaker end control module 27 turns on or turns off by a first operating button 2113 (e.g., being pressed for a long time), further turning on or off the speaker body 20. Secondly, the speaker end control module 27 controls the speaker end Bluetooth

communication module 24 to signally connected to any one of the external Bluetooth devices when no music signal is transmitted, and plays or pauses playback actual sound corresponding to a transmitted music signal from the connected external Bluetooth devices and / or the voice signal through the medium and low frequency speaker and the high frequency speaker by a second operating button (e.g., being pressed for a short time). Preferably, the second control button 2114 can be connected to a multi-color LED light (not shown), and the operation status of the second control button 2114 can be represented by different colors and flashing modes. For example, flashing blue light means waiting for connection, and continuous red light means playing music. Thirdly, the speaker end control module 27 removes or restores a vocal part of the music signal by a third operating button (e.g., being pressed for a short time). In this way, when the user sings with the actual music played according to the music signal, the original vocals can be eliminated, allowing the user to enjoy the fun of solo singing. Short press the third control button 2115 when the vocals are eliminated, and the eliminated vocals are restored. It should be noted that the volume is not under the control of the speaker body 20, but by the microphone 10 (for vocal control) or the connected external Bluetooth devices (for music control).

[0039] See Fig. 8. The top cover of the microphone accommodating slot 2111 in Fig. 7 is removed to show the interior design of the microphone accommodating slot 2111. A USB charging plug 21113 is installed on a close end 21112 of the microphone accommodating slot 2111. The USB charging plug 21113 and the indicator 2116 are electrically connected to the speaker end power module 26. When the microphone 10 is placed in the microphone accommodating slot 2111 and the microphone end USB slot 114 is electrically connected to the USB charging plug 21113, the speaker end power module 26 charges the microphone 10 and the indicator 2116 lights up. Thus, the user can know the current location and status of the microphone 10. In addition, a fixing hook 115 is further installed on the bottom of the case 11. An elastic hook 21114 corresponding to the fixing hook 115 is installed inside a close end 21112 of the microphone accommodating slot 2111. When the microphone 10 is inserted into the microphone accommodating slot 2111, the elastic hook 21114 hooks the fixing hook 115. When the

microphone 10 is further pressed, the elastic hook 21114 releases the fixing hook 115 and pops up the microphone 10.

[0040] The aforementioned speaker end audio receiving jack 2117 and the speaker end control module 27 are also signally connected, so that the speaker end control module 27 can play or pause playback an actual music corresponding to a music signal transmitted from an audio plug (3.5 audio connector) plugged in the speaker end audio receiving jack 2117 through the medium and low frequency speaker 22 and the high frequency speaker 23. Namely, in addition to inputting the music signal to the speaker body 20 through the speaker end Bluetooth communication module 24 for playback, it can also be input to the speaker body 20 through a traditional audio cable.

[0041] Refer to Fig. 10 and Fig. 11. Fig. 10 illustrates the state when the waterproof silicone cover 30 is removed from the speaker body 20. Fig. 11 illustrates the state when a carry strap 31 on the speaker body 20 is removed. The waterproof silicone cover 30 covers the shell structure 21 except the sound transparent perforated cover 213, so that the speaker body 20 covered by the waterproof silicone cover 30 will not let the sound produced by the speaker be blocked by the waterproof silicone cover 30 itself. The waterproof silicone cover 30 can provide a certain degree of waterproof function to the covered part, and also protect the speaker body 20 against a certain degree of impact. A number of (e.g., 4) suckers 32 on the bottom of the waterproof silicone cover 30 are used to removably fix the speaker body 20 on a plane. A side of the waterproof silicone cover 30 has a first openable cover 33 formed corresponding to the speaker end USB slot 2112. When the first openable cover 33 is opened, the speaker end USB slot 2112 can be used; when the first openable cover 33 is closed, the speaker end USB slot 2112 can be protected from external water. In addition, the side of the waterproof silicone cover 30 has a second openable cover 34 formed corresponding to the open end 2111. When the second openable cover 34 is opened, the microphone 10 in the microphone accommodating slot 2111 can be taken out; When the second openable cover 34 is closed, it can prevent external water from flowing into the microphone accommodating slot 2111.

[0042] According to the present invention, two nuts 2119 are installed on two opposite positions of the lower shell 211, respectively. Each nut 2119 goes through a through hole 35 correspondingly formed on the waterproof silicone cover 30. A carry

strap 31 with perforations at both ends is rotatably connected to the speaker body 20 by passing each nut 2119 through one of the perforations and securing the nut 2119 with a screw 21191.

[0043] In addition to play music with one multifunctional portable Bluetooth speaker 1, two speaker bodies 20 can also be interconnected to play music in a master-slave structure. At this point the music can have a stereo effect. To this end, the speaker end control module 27 of each speaker body 20 can be set as one of a master or a slave. When two speaker bodies 20 are signally connected through their speaker end Bluetooth communication modules 24, the speaker end control module 27 set as the master sends the music signal unidirectionally to the speaker end control module 27 set as the slave.

[0044] In addition, the speaker end control module 27 and the microphone end control module 16 conform to the USB-OTG specification, so that both of the speaker end USB slot 2112 and the microphone end USB slot 114 are capable of receiving the music signal transmitted from a plugged USB plug and transmitting the voice signal to the USB plug. Thus, there are channels for signal transmission by wire.

[0045] See Fig. 12. It illustrates an application aspect of the present invention: recording via external mobile phone. Take an OTG cable 3 with one end connected to the speaker end USB slot 2112 of the speaker body 20 and the other end connected to a USB socket of a first mobile phone 2. In addition, push the slide key 1136 of the microphone 10 to the first end 11361. The first mobile phone 2 can connect to a singing platform. The singing platform provides song music and accompaniment videos without vocals. When the first mobile phone 2 accompaniment videos, the music signal of the song will be sent to the speaker body 20 through the OTG cable 3. The speaker body 20 can thus play the music of the song synchronously. The user holds the microphone 10, watches the accompaniment video on the first mobile phone 2 screen and sings. The vocals are transmitted to the speaker end U-band communication module 25 through the microphone end U-band communication module 13. In addition to playing synchronously with the music of the song through the speaker group, the vocals are also transmitted to the first mobile phone 2 through the OTG cable 3, and finally transmitted back to the singing platform. Vocals and the music of the song can be synthesized and recorded on the singing platform.

[0046] See Fig. 12. It illustrates another application aspect of the present invention: live streaming vocal accompaniment. In this application, it requires two mobile phones: the first mobile phone 2 and the second mobile phone 4. The first mobile phone 2 is connected to a live streaming platform. The second mobile phone 4 is connected to a singing platform. The microphone end audio transceiver jack 116 of the microphone 10 and an earphone jack of the first mobile phone 2 are signally connected by a first audio cable 5 which has 3.5 audio connectors on both ends. The microphone end audio receiving jack 117 of the microphone 10 and the speaker end audio receiving jack 2117 of the speaker body 20 are signally connected by a second audio cable 6 which has 3.5 audio connectors on both ends. The slide key 1136 of the microphone 10 is pushed to the second end 11362. Meanwhile, the microphone end Bluetooth communication module 14 and the Bluetooth module of the second mobile phone 4 are signally connected. When the first mobile phone 2 starts the live streaming service of the live streaming platform, the image of a live streaming room is presented on the screen of the first mobile phone 2 and voice is transmitted to the speaker body 20 for playback via the first audio cable 5, the microphone 10 and the second audio cable 6. The user's voice is transmitted to the first mobile phone 2 via the first audio cable 5, and relayed back to the live streaming platform. At this time, the second mobile phone 4 initiates the song service of the singing platform. Music of the song and accompaniment video will be uploaded to the second mobile phone 4. The accompaniment video is presented on the screen of the second mobile phone 4. The music of the song is transmitted to the microphone 10 by Bluetooth transmission, and then is transmitted to the speaker body 20 through the second audio cable 6 for playback. At the same time, the voice of the user singing through the microphone 10 is not only transmitted to the speaker body 20 through the second audio cable 6 for playback, but also accompanied by the music of the song, transmitted back to the first mobile phone 2 through the first audio cable 5, and finally transmitted to the live streaming room of the live streaming platform. Namely, while singing, vocals and music can also be heard in the live streaming room.

[0047] While the invention has been described in terms of what is presently considered to be the most practical and preferred embodiments, it is to be understood that the invention needs not be limited to the disclosed embodiments. On the contrary, it is

intended to cover various modifications and similar arrangements included within the spirit and scope of the appended claims, which are to be accorded with the broadest interpretation so as to encompass all such modifications and similar structures.

WHAT IS CLAIMED IS:

1. A multifunctional portable Bluetooth speaker, comprising:
 - a microphone, having a microphone end U-band communication module, transmitting a voice signal converted from received sound;
 - a speaker body, comprising:
 - a shell structure, appearance thereof close to a circle viewed from the top, comprising:
 - a lower shell, having a microphone accommodating slot formed inside to accommodate the microphone, wherein an open end of the microphone accommodating slot is formed on a sidewall of the lower shell, and a plurality of operating buttons and a speaker end USB slot are installed on the sidewall;
 - a top cover, connected to the lower shell, wherein two openings are formed on the top of the top cover; and
 - a sound transparent perforated cover, installed above the top cover, covering the two openings;
 - a medium and low frequency speaker, installed inside the lower shell, facing one of the two openings;
 - a high frequency speaker, installed inside the lower shell, facing the other one of the two openings;
 - a speaker end Bluetooth communication module, installed inside the lower shell, capable of signal connection to a plurality of external Bluetooth devices to receive music signals;
 - a speaker end U-band communication module, installed inside the lower shell and wirelessly connected with the microphone end U-band communication module, receiving the voice signal;
 - a speaker end power module, installed inside the lower shell, electrically connected to the medium and low frequency speaker, the high frequency speaker, the speaker end Bluetooth communication module and the speaker end U-band communication module, transmitting power to electrically connected elements and storing external power from the speaker end USB slot; and
 - a speaker end control module, installed inside the lower shell, switchably and

electrically connected to the speaker end power module, and signally connected to the speaker end Bluetooth communication module, the speaker end U-band communication module, the medium and low frequency speaker, the high frequency speaker, the speaker end USB slot and the operating buttons, executing following operations:

turning on or turning off by a first operating button;

controlling the speaker end Bluetooth communication module to signally connected to any one of the external Bluetooth devices, and playing or pausing playback actual sound corresponding to a transmitted music signal from the connected external Bluetooth devices and / or the voice signal through the medium and low frequency speaker and the high frequency speaker by a second operating button; and

removing or restoring a vocal part of the music signal by a third operating button; and

a waterproof silicone cover, covering the shell structure except the sound transparent perforated cover, wherein a plurality of suckers on the bottom of the waterproof silicone cover are used to removably fix the speaker body on a plane, and a side of the waterproof silicone cover has a first openable cover formed corresponding to the speaker end USB slot and a second openable cover formed corresponding to the open end.

2. The multifunctional portable Bluetooth speaker according to claim 1, wherein two nuts are installed on two opposite positions of the lower shell, respectively, each nut goes through a through hole correspondingly formed on the waterproof silicone cover, and a carry strap with perforations at both ends is rotatably connected to the speaker body by passing each nut through one of the perforations and securing the nut with a screw.

3. The multifunctional portable Bluetooth speaker according to claim 1, wherein a speaker end audio receiving jack is further installed on the sidewall of the lower shell further, and the speaker end audio receiving jack and the speaker end control module are signally connected, so that the speaker end control module plays or pauses playback an actual music corresponding to a music signal transmitted from an audio plug plugged in the speaker end audio receiving jack through the medium and low frequency speaker and

the high frequency speaker.

4. The multifunctional portable Bluetooth speaker according to claim 1 wherein the microphone further comprises:

a case, wherein a plurality of open ends are formed on top of the case, a porous metal case is fixed in the open ends, a plurality of control buttons are fixed on the side of the case, and a microphone end USB slot is installed on the bottom of the case;

a radio module, installed in the case, converting an external sound into the voice signal through the porous metal case;

a microphone end Bluetooth communication module, installed in the case, capable of signally connecting to the external Bluetooth devices;

a microphone end power module, installed in the case and electrically connected to the microphone end U-band communication module, the microphone end Bluetooth communication module and the radio module, transmitting power to electrically connected components and storing external power from the microphone end USB slot; and

a microphone end control module, installed in the case, switchably and electrically connected to the microphone end power module, and signally connected with the microphone end Bluetooth communication module, the microphone end U-band communication module, the radio module, the microphone end USB slot, and the control buttons, executing following operations:

turning on or turning off by a first control button;

increasing the volume of the voice signal by a second control button;

reducing the volume of the voice signal by a third control button;

increasing the echo effect of the voice signal by a fourth control button; and

reducing the echo effect of the voice signal by a fifth control button.

5. The multifunctional portable Bluetooth speaker according to claim 4, wherein a fixing hook is further installed on the bottom of the case, an elastic hook corresponding to the fixing hook is further installed inside a close end of the microphone accommodating slot, and when the microphone is inserted into the microphone accommodating slot, the elastic hook hooks the fixing hook; when the microphone is further pressed, the elastic hook releases the fixing hook and pops up the microphone.

6. The multifunctional portable Bluetooth speaker according to claim 4, wherein a microphone end audio transceiver jack and a microphone end audio receiving jack are further installed on the bottom of the case, signally connected with the microphone end control module, and capable of connecting to an earphone audio plug, respectively, when the earphone audio plug is plugged into the microphone end audio transceiver jack, the microphone end control module transmits the voice signal externally through the earphone audio plug or receives the music signal from the earphone audio plug, and when the earphone audio plug is plugged into the microphone end audio receiving jack, the microphone end control module transmits the voice signal and / or received music signal externally through the earphone audio plug.

7. The multifunctional portable Bluetooth speaker according to claim 6, wherein a slide key is further installed on the side of the case and signally connected with the microphone end control module, when the slide key slides to a first end, the microphone end control module turns on the microphone end U-band communication module and cuts off signal transmission between the microphone end audio transceiver jack and the microphone end audio receiving jack, and when the slide key slides to a second end, the microphone end control module turns off the microphone end U-band communication module and restores signal transmission between the microphone end audio transceiver jack and the microphone end audio receiving jack.

8. The multifunctional portable Bluetooth speaker according to claim 1, wherein the speaker end control module is set as one of a master or a slave, and when two speaker bodies are signally connected through their speaker end Bluetooth communication modules, the speaker end control module set as the master sends the music signal unidirectionally to the speaker end control module set as the slave.

9. The multifunctional portable Bluetooth speaker according to claim 4, wherein a USB charging plug is further installed on a close end of the microphone accommodating slot, an indicator is further installed on the sidewall of the lower shell, the USB charging plug and the indicator are electrically connected to the speaker end power module, and when the microphone is placed in the microphone accommodating slot and the microphone end USB slot is electrically connected to the USB charging plug, the speaker end power module charges the microphone and the indicator lights up.

10. The multifunctional portable Bluetooth speaker according to claim 4, wherein the speaker end control module and the microphone end control module conform to the USB-OTG specification, so that both of the speaker end USB slot and the microphone end USB slot are capable of receiving the music signal transmitted from a plugged USB plug and transmitting the voice signal to the USB plug.