Designed and Implemented of Wireless Headphones

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ABSTRACT

The design is based on CRS8635 chip development, the use of the wireless Bluetooth headset module. Bluetooth headset module 2.4GHZ band in the free use of state, wireless connection and exchange data between multiple devices to communicate with devices via micro-grid transmission. This design will analyze and explain the Bluetooth module transceiver module amplifier module three modules used in wireless headset design, implementation device is connected, adjust volume, change tracks, answer / reject a call-back function, the design of the basic realization of the design required function, to achieve the desired operational, developmental.

KEYWORDS

Bluetooth module; wireless connectivity; band; headphone.

PROGRAM DESIGN

Functional requirements

(1) Design an audio signal output as an input signal. A wireless headset capable of transmitting audio signals over a short distance, which uses a wireless channel as a transmission channel
(2) Requires the wireless headset to allow multiple receivers to receive signals at the same time and the maximum transmission is greater than 4 meters.
(3) Additional features: in a certain space and range, to achieve stereo output.

Options

(1) Bluetooth communication, also known as wireless Bluetooth technology, when the Bluetooth function of the multimedia device with the successful match, before use. Bluetooth technology has a short distance, low cost, no cable features, so as to existing data networks and small peripherals interface provides a unified connection. Transmission capacity, security, transmission distance, high stability, not limited to the point or surface (can point to the opposite transmission), low power consumption, low cost, etc.

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SYSTEM PRINCIPLE

This Bluetooth headset is automatically turned on in the case of power on, with the successful connection in the phone, the Bluetooth headset can start work, do not need to match the key when the power of that is connected, but without matching with the phone, the two LED lights of Bluetooth hardware version will flash alternately. After connected successful, LED lights will be into a single light flashing due to IO interface feedback current. In this way, the Bluetooth headset pairing is successful and the corresponding function can be performed, such as playing music, adding and subtracting the volume, changing the up and down tracks, calling / hanging up and calling back.

HARDWARE CIRCUIT DESIGN

Frequency transceiver circuit is the basis of Bluetooth transmission. In the RF circuit, we embedded into the Bluetooth chip to form a high integration of a Bluetooth module or transceiver module. Therefore, the study of Bluetooth transceiver module, the case of integrated chip, we can directly refer to the chip function pin.

If we want to study the composition of the chip modules separately, we will discuss several aspects, such as the composition of the RF circuit, which includes part of the differential signal output, power amplification, the choice of double-edged,
band-pass filter, the final antenna side of the receiver and then sent to the chip to achieve data conversion. Bluetooth chip principle shown in Figure 1 below.

**Power amplifier**

In practical applications, a practical amplifier circuit is required to be able to amplify and output the signal source signal to be amplified without distortion, and to provide a sufficiently large power to the driven load. The input level, the intermediate stage and the output stage are his main components, usually speaking.

These three parts assume different tasks and roles. The input stage is connected to the signal source to be amplified. Therefore, the input stage requires a large input resistance, low noise of the circuit, strong ability of common mode rejection, and impedance matching. The main function of the intermediate stage is to amplify the voltage of the signal to ensure that there is a large enough voltage output.

The output stage is mainly responsible for providing sufficient power to the load (such as speakers, motors, etc.) in order to enable it to be effectively driven.

In general, it is a power amplifier circuit.

**Microphone, headset connection schematic**

(1) CSR8635 Bluetooth chip composed of Bluetooth headset has two left and right output, so the circuit design also has about two circuits. With the Bluetooth module USB stereo card connection, while the software to adjust the audio signal, the signal will eventually output to the three-wire connection on the speaker, we can hear the stereo from the left and right two-channel. Headset connection is as follows:

Bluetooth module CSR8635 microphone is operated during the audio input, but the microphone requires a DC bias to work.

![Figure 3. Headset connection schematic.](image1)

![Figure 4. Schematic diagram of the microphone connection.](image2)
The positive output of the microphone is a depleted FET that connects the DC bias through a 2.2 (R2) resistor. The microphone is connected to the ground. The audio AC signal generates a differential signal through the DC bias at both ends of R2 as the audio input signal, respectively. C1 and C2 capacitors block the DC signal.

**Schematic of key control**

Function control is achieved through touching the switch, in simple terms, five touch switch have their own duties.

Features include: volume increase or decrease, track conversion, answer and hang up, pause playback and callback. The following figure describes the principle of touch switch connection, the schematic diagram is shown in Figure 5.

**DEBUGGING AND ANALYSIS**

When the Bluetooth module successfully searches for a cell phone signal or the phone matches the Bluetooth module successfully. After the Bluetooth module is powered on, the Bluetooth module is blinking in the pairing pair; after the pairing is successful, the single lamp LED2 blinks and the LED1 is off.

Open the phone's Bluetooth function, connected to the design of the power, the phone will search the Bluetooth module CRS8635 pairing information and can be automatically matched, matching success, no need to verify the information.

The Bluetooth module CRS8635 will receive the transmission signal and convert the signal to the audio signal through the speaker through the amplifier module.

**SUMMARY**

Above all, in terms of wireless transmission distance, we can increase the power of the DC power supply, but also reduce the resistance of the resistance and increase the capacitance value to make the intensity of the transmitted signal is enhanced. In addition, if you want to significantly increase the transmission distance, it is necessary to take into account the transmission environment and the maximum transmission gain.

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