(19) Korean Intellectual Property Office (KR)
(12) Official Gazette of Unexamined Utility Models (U)

(51). Int. Cl.[6] H04R 3/00
(11) Publication Number: 2000-0006888
(43) Publication Date: April 25, 2000

(21) Application Number 20-1998-0018161
(22) Application Date September 23, 1998

(71) Applicant Doshin Co., Ltd. Duk Ha Lee
Ham Inhwa, 641-11 Deungchon-dong, Gangseo-gu, Seoul
#3, 632 Deungchon-dong, Gangseo-gu, Seoul
(72) Designer(s) In Hwa Kim
632-3, Deungchon-dong, Gangseo-gu, Seoul
Gun Yung An
632-3, Deungchon-dong, Gangseo-gu, Seoul
(74) Agent(s) Suk Heum Gweon, Yung Pil Lee, Sang Yong Lee

Examination Requested: Requested

(54) Code division type transmission circuit and wireless headphone reception circuit

Abstract

The present design relates to a code division type transmission circuit and a wireless headphone reception circuit for transmitting and receiving signals in a code division method. The present design comprises a codec unit 7 for encoding a signal applied from a signal source 8; a central control modem unit 6 for performing error correction by receiving the output of the codec unit 7 as an input and spreading a signal band; and a base band unit 5 that receives the output of the central control modem unit 6 as an input, converts it into an intermediate frequency and outputs the converted signal; wherein a signal output from the base band unit 5 is amplified and filtered, and a gain of the signal is controlled and transmitted to an antenna A. Further, in a wireless headphone receiving circuit for amplifying and filtering a signal wirelessly applied through an antenna A and controlling a gain to output an audio signal to an output unit 9, the wireless headphone receiving circuit of the code division method comprises a base band unit 5 for processing the gain-controlled signal as an input and processing it at an intermediate frequency; a central control modem unit 6 for removing an error correction and a pseudorandom code by receiving the output of the base band unit 5 as an input; a codec unit 7 for decoding an audio signal by receiving the output of the central control modem unit 6 as an input; and an amplifier unit 1c that amplifies the signal output from the codec unit 7 as an input and outputs the amplified audio signal to the output unit 9.

Representative Drawing

FIG. 1

Specification

Brief Description of the Drawings

FIG. 1 is a block diagram of a transmission circuit of a code division method according to the present design.
FIG. 2 is a block diagram of a wireless headphone receiving circuit of a code division method according to the present design.

<Explanation of symbols for major parts of drawings>

1a: First amplifier unit
1b: Second amplifier unit
1c: Third amplifier unit
2a: First filter unit
2b: Second filter unit
3: Converter unit
4: Gain control unit
5: Base band unit
6: Central control modem unit
7: Codec unit
8: Signal source

Detailed Description of the Design

Purpose of the Design

DOCKET ALARM
Find authenticated court documents without watermarks at docketalarm.com.

Technical Field of the Design and Prior Art

The present design relates to a wireless head phone transmission and reception circuit; in particular the present design relates to a code division type transmission circuit and wireless headphone reception circuit that transmit and receive signals using the Code Division Multiple Access (CDMA) method.

In general, a headphone is a design used to provide audio only to a user who uses the headphone by receiving an audio signal wirelessly or wired; in addition, the code division multiple access method (hereinafter referred to as the code division method) is a method of sharing a frequency by extending a signal into a frequency band that is much wider than the bandwidth of the required amount of information. In other words, it shares all frequency and time and maintains orthogonality with a unique code assigned to it. In this case, in the code division method, a signal to be transmitted is extended by receiving a unique Pseudo Random (PN) code.

Headphones according to the prior art are connected by wire or wirelessly to an amplifier of an audio device, and receive an audio signal provided from the amplifier of the audio device and provide the audio signal to a user.

However, since the headphones according to the prior art have an analog FM modulation method or an infrared method, the sound quality of the audio signal output from the headphones is reduced due to interference or collision with surrounding frequencies within a certain frequency band, so that there is a problem in that it is difficult to implement a high quality audio signal due to a fading phenomenon.

Technical Problem to be Solved by the Design

The object of the present design is, in receiving audio signals wirelessly and playing the same with high quality sound, to provide a wireless headphone receiving circuit of a code division method that has a channel separation of 90 dB or more and a distortion ratio of 0.01% or more, which is equivalent to that of a compact disk, and a data transmission rate of 1.5 Mbps, to overcome the noise and interference of analog wireless headphones.

Another object of the present design is to apply a spread spectrum modulation method, which is a CDMA method, wherein in PCS, which is a personal mobile phone, the transmission rate is 14.4 kbps, and the frequency band is set from 902 MHz to 928 MHz.

Configuration and Operation of the Design

To achieve the above object, the transmission circuit of the code division method according to the present design comprises, in a transmission circuit for wirelessly transmitting a signal through an antenna A, a codec unit 7 for encoding a signal applied from a signal source 8; a central control modem unit 6 for performing error correction by receiving the output of the codec unit 7 as an input and spreading a signal band; and a base band unit 5 that receives the output of the central control modem unit 6 as an input, converts the output into an intermediate frequency and outputs the converted signal; wherein a signal output from the base band unit 5 is amplified and filtered, and a gain of the signal is controlled and transmitted to an antenna A.

To achieve the above object, the wireless headphone receiving circuit of the code division method of the present design comprises, in a wireless headphone receiving circuit for amplifying and filtering a signal wirelessly applied through an antenna A and controlling a gain to output an audio signal to an output unit 9, a base band unit 5 for processing the gain-controlled signal as an input and processing it at an intermediate frequency; a central control modem unit 6 for removing an error correction and a pseudorandom code by receiving the output of the base band unit 5 as an input; a codec unit 7 for decoding an audio signal by receiving the output of the central control modem unit 6 as an input; and an amplifier unit 1c that amplifies the signal output from the codec unit 7 as an input and outputs the amplified audio signal to the output unit 9.

Hereinafter, the operation of the transmission circuit of the code division method according to the present design configured as described above will be described.

FIG. 1 is a block diagram showing a transmission circuit of a code division method according to the present design. As shown, the transmission circuit of the code division method according to the present design comprises a signal source 8, a codec 7, a central control modem 6, a base band 5, a gain control unit (Automatic Gain Control: AGC) 4, a converter 3, first and second filter units 2a and 2b, first and second amplifier units 1a and 1b, and antenna A.

In the transmission circuit of the code division method according to the present design configured as described above, an analog or digital audio signal of stereo (L, R; Left, Right) applied from the signal source 8, which is an audio device, is applied to the codec unit 7.

The codec unit 7 encodes the applied audio signal, converts the encoded signal into a digital signal, and applies it to the central control modem unit 6.

The central control modem unit 6 performs error correction encoding on the applied signal and performs immunity processing so as not to be affected by noise generated in the communication channel, spreads a high-speed pseudorandom code with a wide band in order to maintain the modulated signal using the DBPSK or DQPSK method with high fidelity sound quality; each extended signal is then encrypted (scrambled), and I and Q signals separated between channels are generated.

In addition, the I and Q basis data, which are two digital signals of the generated I and Q signals, enter the I digital/analog converter (DAC), which is not shown at the rising edge where the transmit clock is raised, and it is noted for reference that the Q digital/analog converter (DAC), which is not shown, is applied at the falling edge.

The I and Q signals are applied to the base band unit 5 for transmission. The base band unit 5 converts the applied signal into an intermediate frequency (IF). For the signal converted to the intermediate frequency, the gain of the signal is controlled by the gain controller 4. Using the code division multiple access method in this manner, accordingly, a signal modulated with an intermediate frequency (IF) carrying code division multiple access data is applied to the gain control unit 4 and the gain thereof is automatically controlled.

DOCKET ALARM
Find authenticated court documents without watermarks at docketalarm.com.

The signal output by controlling the gain in the gain control unit 4 is applied to the input terminal of the converter unit 3; the signal applied to the converter unit 3 is a mixture of a local oscillation signal and an intermediate frequency signal to generate a sum and difference signal of the two signals, and the sum signal is applied to the second filter unit 2b as a transmission frequency. The signal applied to the second filter unit 2b to remove noise and passing through only a certain transmission frequency band is amplified through the second amplifier unit 1b and the first filter unit 2a, and noise is removed again so that the signal that has passed through the first amplifier unit 1a and the first filter unit 2a, which are power amplifiers, is amplified, the noise is removed, and the signal is transmitted through the antenna A.

FIG. 2 is a block diagram showing a wireless headphone receiving circuit of a code division method according to the present design.

The wireless headphone receiving circuit of the code division method according to the present design comprises an antenna A, first and second filter units 2a and 2b, first and second amplifier units 1a and 1b, a converter unit 3, a gain control unit 4, a base band unit 5, a central control modem unit 6, a codec unit 7, a third amplifier unit 1c, and an output unit 9.

The output unit 9 is preferably a speaker equipped in the wireless headphones.

Hereinafter, the operation of the wireless headphone receiving circuit of the code division method according to the present design configured as above will be described.

With the signal transmitted through the antenna A shown in FIG. 1, a stereo analog audio signal or a digital audio signal is wirelessly applied through the antenna A shown in FIG. 2. The signal that is applied wirelessly is processed in the reverse order of signal processing in the transmission circuit shown in FIG. 1.

In other words, the insignificant audio signal applied to the antenna A of the headphones is amplified by the first amplifier unit (1a), which is a power amplifier, is then amplified through the first filter unit 2a, the second amplifier unit 1b, and the second filter unit 2b, and noise is removed and the signal is applied to the converter unit 3.

The frequency of the signal applied to the converter unit 3 is converted, and the gain of the signal is controlled through the gain control unit 4, which is an automatic gain control unit.

As described above, the gain-controlled signal is processed to an intermediate frequency through the base band unit 5 and applied to the central control modem unit 6. The central control modem unit 6 removes the carrier pseudorandom code from the applied signal. The signal from which the noise code is removed from the central control modem unit 6 is applied to the codec unit 7. The codec unit 7 decodes the applied signal to decode the encoded signal, and outputs the decoded signal to the third amplifier unit 1c.

The audio signal input to the third amplifier unit 1c is amplified and applied to the output unit 9, which is a speaker of the wireless headphone, and thus, a high quality sound in stereo is transmitted to the users ear as an audio signal.

The description of the drawings and specifications are merely illustrative of the present design, and is only used for the purpose of describing the present design, and is not used to limit the meaning or the scope of the present design described in the utility model registration claims. Therefore, those of ordinary skill in the art will understand that various modifications and equivalent other embodiments are possible therefrom. Consequently, the true technical protection scope of the present design will have to be determined by the technical idea of the annexed utility model registration claims.

Effect of the Design

According to the present design, by using the code division method, by having a channel separation of 90dB or more and a distortion ratio of 0.01% or more, corresponding to the sound quality of audio using a compact disc, since the data transmission rate is set to 1.5 Mbps so as to have high-quality data transmission capability, noise and interference are prevented from the audio signal applied to the headphone speakers, thereby providing high-quality audio to the user.

(57) Scope of Claims

Claim 1

A transmission circuit of the code division method, comprising, in a transmission circuit for wirelessly transmitting a signal through an antenna (A),

a codec unit 7 for encoding a signal applied from a signal source 8;

a central control modem unit 6 for performing error correction by receiving the output of the codec unit 7 as an input and spreading a signal band; and

a base band unit 5 that receives the output of the central control modem unit 6 as an input, converts it into an intermediate frequency and outputs the converted signal;

wherein a signal output from the base band unit 5 is amplified and filtered, and a gain of the signal is controlled and transmitted to an antenna A.

Claim 2

A wireless headphone receiving circuit of the code division method, comprising, in a wireless headphone receiving circuit for amplifying and filtering a signal wirelessly applied through an antenna A and controlling a gain to output an audio signal to an output unit 9,

a base band unit 5 for processing the gain-controlled signal as an input and processing it at an intermediate frequency;

a central control modem unit 6 for removing an error correction and a pseudorandom code by receiving the output of the base band unit 5 as an input;

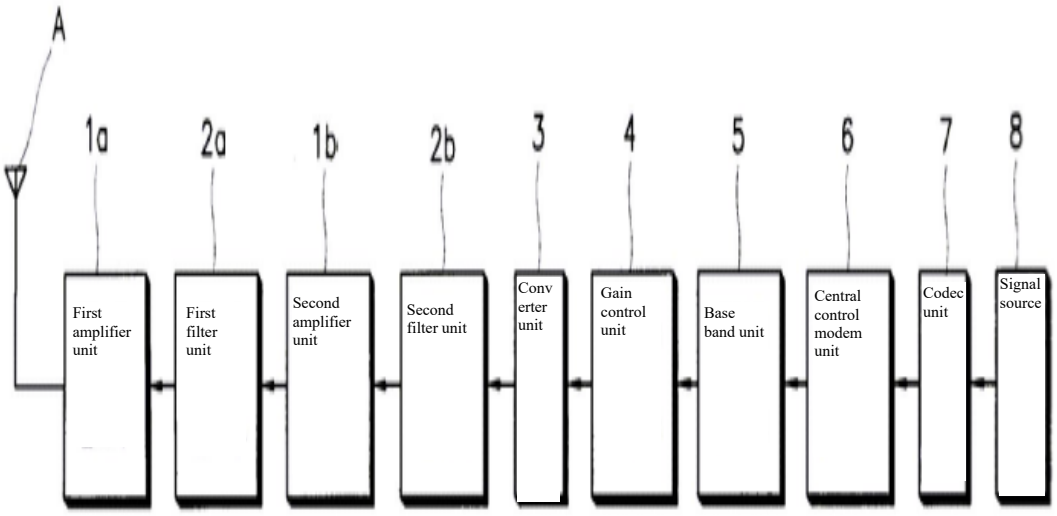
a codec unit 7 for decoding an audio signal by receiving the output of the central control modem unit 6 as an input; and

an amplifier unit 1c that amplifies the signal output from the codec unit 7 as an input and outputs the amplified audio signal to the output unit 9.

DOCKET ALARM
Find authenticated court documents without watermarks at docketalarm.com.

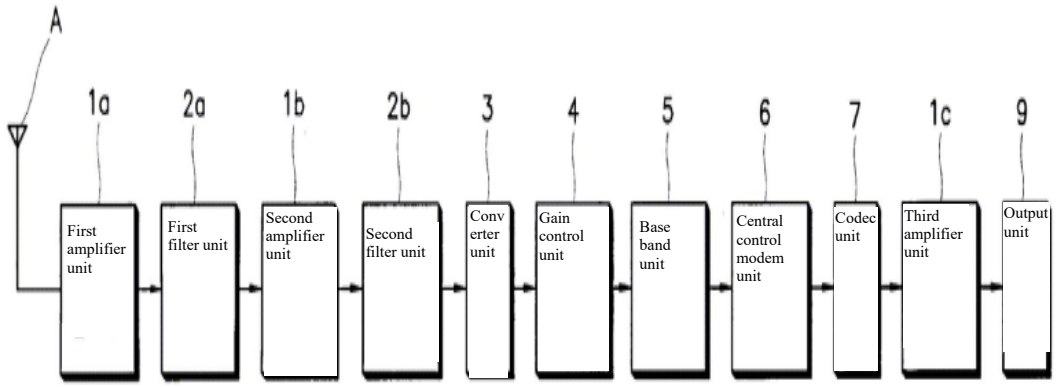
Drawings

FIG. 1



DOCKET ALARM
Find authenticated court documents without watermarks at docketalarm.com.

FIG. 2



DOCKET ALARM
Find authenticated court documents without watermarks at docketalarm.com.

DOCKET ALARM

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts

Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research

With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips

Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS
Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS
Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS
Sync your system to PACER to automate legal marketing.