Description

The present invention relates to an audio and light reproducing system comprising an optical disc such as a compact disc, a laser disc or the like suitable for use with A KARAOKE EQUIPMENT and particularly to an optical disc in which lighteffect information is recorded in a user's area forming a part of a sub-code arranged in the format together with a synchronizing signal and a digital audio signal.

BACKGROUND ART

An audio and light reproducing system according to the first part of claim 1 is known from Patents Abstracts of Japan, vol. 8, no. 144 (P-284)-(158) 05 July 1984, SONY K.K.. In relation to this known audio and light reproducing system visual means in form of LED's is controlled by a notifying signal recorded together with a music information signal on the disc. The LED's are timed in accordance with the tempo of the melody.

From British Kinematography Sound and Television Society Journal, vol. 65, no. 7, July 1983, London GB, pages 384 to 388; Margent: "Interfacing A-V Equipment to Compact Disc" it is known to control visual means such as slide projectors. This system does not store control data on the disc itself but it is mentioned that it one day will be possible. It is further mentioned that the system could be used for all sorts of control and not only slide shows.

A so-called KARAOKE equipment is known, by which a singer is able to sing a song at a mike to the accompaniment of a music signal recorded on a compact disc or a laser disc. In this case, in order to improve stage effect, a lighteffect technician, while listening to a piece of music now played, usually makes control over brightness, hue or the like of a lighteffect apparatus in accordance with the level of a music signal or the frequency of the music signal.

However, according to the above-mentioned conventional method for controlling the lighteffect on the basis of the level of the music signal, the frequency thereof or the like, only the lighteffect control is simple, so that satisfactory stage effect could not be achieved. Further, a method in which a lighteffect staff really manipulates a lighteffect apparatus requires many hands, and also, it is difficult to reproduce the lighteffect.

DISCLOSURE OF INVENTION

The present invention is, in view of the above-mentioned aspect, to provide an audio and light reproducing system comprising an optical disc which can improve stage effect associated with the lighteffect upon reproduction of a piece of music without hands.

According to one embodiment of the present invention defined in claim 1, in an optical disc in which a music source is recorded, there is provided an optical disc in which a lighteffect information is recorded in its user's area of the sub-code.

Further, according to the present invention, a lighteffect information is recorded in a user's area of an optical disc in which a music source is recorded so that a stage light control signal previously programmed is recorded in the user's area of the same medium as that of the music source. Thus, by controlling the lighteffect on the basis of the reproduced output, a sophisticated lighteffect control can be reproduced with ease and a stage effect associated with a lighteffect when listening to a piece of music can be increased.

BRIEF DESCRIPTION OF DRAWINGS

Figs. 1, 2, 3 and 4 are respectively illustrations used to explain an embodiment of an optical disc to be used with the present invention, Fig. 5 is a block diagram showing an example of how to edit the data shown in Fig. 1, Fig. 6 is a block diagram showing an example of how to cut the data shown in Fig. 1 and Fig. 7 is a block diagram showing an example of an apparatus for reproducing an optical disc according to the present invention.

BEST MODE FOR CARRYING OUT THE INVENTION

An example of an optical disc of the present invention, or the application thereof to a compact disc will hereinafter be described with reference to Figs. 1 to 7.

A sub-code and a music source are recorded in the compact disc to which the embodiment of the present invention is applied. Data format of the present compact disc will be described first with reference to Figs. 2 and 3.

Fig. 2 shows one frame of data recorded in the compact disc, in which one frame assumes 588 bits of recording data. A frame synchronising pulse FS of a particular bit pattern at every frame is followed by a dc component suppression bit RB of 3 bits. Further, there are provided 0 to 32nd data bits DB of 14 bits each and the dc component suppression bits RB of 3 bits alternately. Of the data bits DB, the 0th data bit is what might be called a sub-code signal which is used to control the reproduction of the disc and to indicate a related information or the like. 1st to 12th and 17th to 28th data bits DB are assigned to audio data of main channel, wherein one word is formed of 16

bits and one frame contains informations of 12 words (6 samples x 2). The remaining 13th to 17th and 29th to 32nd data bits DB are assigned to parity data of error-correction codes in the main channel. The data bits DB each result from converting more significant 8 bits or less significant 8 bits of 16 bits in one word into 14 bits through an 8-to-14 conversion upon recording.

Fig. 3 shows a data format of one block where 98 frames are sequentially arranged in parallel to one another, removing the dc component suppression bits and assuming that the data bits DB are each formed of 8 bits. Sub-code signals P to W of 0th and 1st frames constitute a sync. pattern of a predetermined bit pattern. With respect to the Q channel, error-detection CRC codes are inserted into 16 frames near the end of 98 frames.

The P channel is a flag used to indicate a pause mode and a music mode. This channel goes to low level for the music mode and to high level for the pause mode. Thus, this channel is made to be a pulse of 2 Hz cycle during a lead out interval so that a piece of music designated can be selected and then reproduced by detecting and counting the P channel. The Q channel enables the control of the same kind to be performed in a more sophisticated fashion. By way of example, a random music selection is made possible in such a manner that an information of the Q channel is supplied to a microcomputer provided within a disc reproducing apparatus to reproduce another music immediately while the reproduction of one music has not yet finished. Other remaining R to W channels are what might be called user's bits, and they are used to indicate a poet, a composer, a comment, a poem of a piece of music recorded on the disc or the like and also used to comment on the same in voice.

Of the 98 bits of the Q channel, first 2 bits form a sync. pattern, next 4 bits form a control bit, next 4 bits form an address bit and following 72 bits form a data bit. A CRC code for detecting an error is assigned to its end. 72 bits of the data bit contain a track number code TNR and an index code X. The track number code TNR changes from 00 to 99, and the index code X similarly changes from 00 to 99. Further, data of the Q channel contains a time-indicating code which indicates a time of a piece of music and a pause and a time-indicating code which indicates an absolute time which sequentially changes from the start of program area to the end of the outermost peripheral side of the compact disc. These time-indicating codes are each formed of codes of two digits representing minute, second and frame. One second is divided into 75 blocks. In order to access the compact disc at the unit shorter than a piece of music as in digital data, the above time-indicating code concerning the absolute time is used.

In such a compact disc, vacant R channel to W channel are called user's areas which can be freely used by the user.

In the present embodiment, as shown in Fig. 1, in the user's area of the sub-code on the compact disc which can be freely used by the user, a lighteffect information is recorded as a user's mode.

In Fig. 1, [1.1.1.0.0.0] on symbol 0 expresses mode 7 and item 0 forming the user's mode. [0.0.0.0.0.1] on symbol 1 expresses a light control mode. An error-correction code is inserted into symbols 2 and 3, and a red color control command code is inserted into symbol 4. As the above-mentioned control command code, 3 kinds of [0.0.0.0.0.0] (no operation NOP), [0.0.0.0.0.1] (fade-in) and [0.0.0.0.1.0.] (fade-out) are selected and inserted. In this embodiment, fade-in, [0.0.0.0.0.1] is inserted. A speed parameter code for fade-in or fade-out is inserted into symbol 5. As the speed parameter code, 0 to 32 seconds, for example, are respectively made equivalent to [0.0.0.0.0.0] to [1.1.1.1.1.1], respectively. In this embodiment, [0.0.0.1.1.1] is selected and is made equivalent to 3.5 seconds. An intensity parameter code is inserted into symbol 6. As the intensity parameter code, for example, 0% to 100% are respectively made equivalent to [0.0.0.0.0.0] to [1.1.1.1.1.1]. In this embodiment, [1.0.0.0.0.0] is selected and is made equivalent to 50%. In this embodiment, when this command is executed, such a control is carried out that, as shown in Fig. 4, the red light is gradually increased to brightness 50% (point ⓑ) from brightness 0% (point ⓐ) presented before the command is executed in 3.5 seconds.

Green color and blue color control command codes are respectively inserted into symbols 7 and 10 similarly as described above, green and blue fade-in and fade-out speed parameter codes are respectively inserted into symbols 8 and 11 similarly as described above, and green and blue intensity parameter codes are respectively inserted into symbols 9 and 12. Further, data concerning other light control modes (lighteffect informations) may be inserted into symbols 13 to 19, if necessary. Error-correction codes are inserted into symbols 20 to 23.

A lighteffect control program matched with a piece of music to be produced in such an optical disc is made as shown in Fig. 5. That is, reference numeral 1 represents a reproducing apparatus which reproduces a music source having a time code (sub-code Q channel) recorded in a compact disc. This reproducing apparatus 1 reproduces a music signal and a time code signal of this music source. The music signal from the reproducing apparatus 1 is supplied through an amplifying cir-

cuit 2 to a speaker 3 which emanates a reproduced sound. Also, the time code signal from this reproducing apparatus 1 is supplied to a light adjusting console 4. While listening to a piece of music from the speaker 3, an editor operates this light adusting console 4 to make control programs for red, green and blue lights, spot light, mirror ball and the like. The control signal of this control program and a time information (based on the time code signal) to be controlled, derived from the light adjusting console 4 are recorded in a floppy disk 6 through a microcomputer 5. When the compact disc of this embodiment is made, as shown in Fig. 6, graphic data recorded on the floppy disk 6 and derived from a lighteffect program data disk 6a is produced therefrom in synchronism with a time code from a music source 1a having the time code, supplied to a sub-code encoder 7 and is thereby encoded. The thus encoded data is supplied to a modulator 8 and the music source 1a having the time code is converted into PCM music data with a compact disc format. This PCM music data is supplied to the modulator 8. This modulator 8 produces at its output side PCM music data shown in Figs. 1 to 3. This music data is supplied to a compact disc cutting machine 9 which cuts a compact disc to thereby produce a compact disc with the lighteffect information of this embodiment inserted thereinto.

The compact disc with the above-mentioned lighteffect information of this embodiment inserted is reproduced as shown in Fig. 7.

The compact disc with the above lighteffect information inserted is reproduced by a compact disc player 10 which is constructed similarly to a conventional compact disc player. The music signal reproduced by this compact disc player 10 is supplied through an amplifying circuit 11 to a speaker 12 which emanates a reproduced sound. Also, the sub-code data obtained by this compact disc player 10 is supplied to a decoder 13, and a control signal based on the control program from the decoder 13 in accordance with the light control mode as shown in Fig. 1 is supplied to a light controller 14. Thus, the light controller 14 controls the red, green and blue lights, the spotlight, the mirror ball or the like in accordance with the control program.

Therefore, according to this embodiment, since the lighteffect information is recorded in the user's area of the compact disc in which the music source having the time code is recorded, the stage control signal previously-programmed is inserted into the user's area of the same media as those of the music source. Thus, by controlling the lighteffect based on the control signal, it is possible to easily reproduce the highly-effective lighting control. Therefore, stage effect presented by the lighteffect while listening to the music can be increased. Further, since the compact disc player 10 for KARAOKE generally includes the sub-code data decoder 13, if the light controller 14, the red, green and blue lights, the spotlight, the mirror ball and so on are provided, the lighteffect can be controlled effectively without hands. Thus, the present invention is very effective in the application to the so-called KARAOKE. Further, in addition to the lighteffect information, it may be possible that control data for ending a piece of music at the end of one music is recorded in the user's bit, whereby the muting is effected by the decoder output.

Furthermore, while the present invention is applied to the compact disc in the above-mentioned embodiment, it is needless to say that the present invention can be applied to other optical discs such as a laser disc or the like.

According to the present invention, the highly-effective lighteffect control can be reproduced with ease in accordance with the lighteffect data program. Thus, the stage effect can be increased by the lighteffect while listening to a piece of music.

EXPLANATION ON REFERENCE NUMERALS

Reference numeral 1 represents the reproducing apparatus for reproducing a music source having a time code, 3 and 12 the speakers respectively, 4 the light adjusting console, 10 the compact disc player, 13 the sub-code decoder and 14 the light controller.

Claims

1. An audio and light reproducing system comprising an optical disc on which a synchronizing signal, a subcode-signal which contains lighteffect control information and audio data are recorded, wherein said optical disc is to be played back so as to reproduce the audio signal from said audio data with an audio reproducing system and at least one light display means being controlled by said lighteffect control information,
characterized in that
said lighteffect control information contains information for hue control, intensity control, fade-in and fade-out control including the speed of fade-in and fade-out.

2. An audio and light reproducing system according to claim 1, wherein said light control means are a spot light, a mirror ball and/or red, green and blue lights.

3. An audio and light reproducing system according to claim 1 or 2, in which a predetermined

cuit 2 to a speaker 3 which emanates a reproduced sound. Also, the time code signal from this reproducing apparatus 1 is supplied to a light adjusting console 4. While listening to a piece of music from the speaker 3, an editor operates this light adusting console 4 to make control programs for red, green and blue lights, spot light, mirror ball and the like. The control signal of this control program and a time information (based on the time code signal) to be controlled, derived from the light adjusting console 4 are recorded in a floppy disk 6 through a microcomputer 5. When the compact disc of this embodiment is made, as shown in Fig. 6, graphic data recorded on the floppy disk 6 and derived from a lighteffect program data disk 6a is produced therefrom in synchronism with a time code from a music source 1a having the time code, supplied to a sub-code encoder 7 and is thereby encoded. The thus encoded data is supplied to a modulator 8 and the music source 1a having the time code is converted into PCM music data with a compact disc format. This PCM music data is supplied to the modulator 8. This modulator 8 produces at its output side PCM music data shown in Figs. 1 to 3. This music data is supplied to a compact disc cutting machine 9 which cuts a compact disc to thereby produce a compact disc with the lighteffect information of this embodiment inserted thereinto.

The compact disc with the above-mentioned lighteffect information of this embodiment inserted is reproduced as shown in Fig. 7.

The compact disc with the above lighteffect information inserted is reproduced by a compact disc player 10 which is constructed similarly to a conventional compact disc player. The music signal reproduced by this compact disc player 10 is supplied through an amplifying circuit 11 to a speaker 12 which emanates a reproduced sound. Also, the sub-code data obtained by this compact disc player 10 is supplied to a decoder 13, and a control signal based on the control program from the decoder 13 in accordance with the light control mode as shown in Fig. 1 is supplied to a light controller 14. Thus, the light controller 14 controls the red, green and blue lights, the spotlight, the mirror ball or the like in accordance with the control program.

Therefore, according to this embodiment, since the lighteffect information is recorded in the user's area of the compact disc in which the music source having the time code is recorded, the stage control signal previously-programmed is inserted into the user's area of the same media as those of the music source. Thus, by controlling the lighteffect based on the control signal, it is possible to easily reproduce the highly-effective lighting control. Therefore, stage effect presented by the lighteffect while listening to the music can be increased. Further, since the compact disc player 10 for KARAOKE generally includes the sub-code data decoder 13, if the light controller 14, the red, green and blue lights, the spotlight, the mirror ball and so on are provided, the lighteffect can be controlled effectively without hands. Thus, the present invention is very effective in the application to the so-called KARAOKE. Further, in addition to the lighteffect information, it may be possible that control data for ending a piece of music at the end of one music is recorded in the user's bit, whereby the muting is effected by the decoder output.

Furthermore, while the present invention is applied to the compact disc in the above-mentioned embodiment, it is needless to say that the present invention can be applied to other optical discs such as a laser disc or the like.

According to the present invention, the highly-effective lighteffect control can be reproduced with ease in accordance with the lighteffect data program. Thus, the stage effect can be increased by the lighteffect while listening to a piece of music.

EXPLANATION ON REFERENCE NUMERALS

Reference numeral 1 represents the reproducing apparatus for reproducing a music source having a time code, 3 and 12 the speakers respectively, 4 the light adjusting console, 10 the compact disc player, 13 the sub-code decoder and 14 the light controller.

Claims

1. An audio and light reproducing system comprising an optical disc on which a synchronizing signal, a subcode-signal which contains lighteffect control information and audio data are recorded, wherein said optical disc is to be played back so as to reproduce the audio signal from said audio data with an audio reproducing system and at least one light display means being controlled by said lighteffect control information,
characterized in that
said lighteffect control information contains information for hue control, intensity control, fade-in and fade-out control including the speed of fade-in and fade-out.

2. An audio and light reproducing system according to claim 1, wherein said light control means are a spot light, a mirror ball and/or red, green and blue lights.

3. An audio and light reproducing system according to claim 1 or 2, in which a predetermined

* C L M S *

area of said sub-code signal is a user's area containing said lighteffect control information.

4. An audio and light reproducing system reproducing apparatus for reproducing an audio signal and a lighteffect control signal from an optical disc according to any one of the preceeding claims,
comprising
a light controller receiving said lighteffect control signal to produce signals for hue control, intensity control, fade-in and fade-out control including the speed of fade-in and fade-out.

Patentansprüche

1. Audio- und Licht-Reproduktionssystem mit einer optischen Platte, auf der ein Synchronisiersignal, ein Subkodesignal, das eine Lichteffekt-Steuerinformation enthält, und Audiodaten aufgezeichnet sind, wobei bei der Wiedergabe der optischen Platte ein Audio-Wiedergabesystem das Audiosignal aus den Audiodaten reproduziert und wenigstens eine Lichtanzeigeeinrichtung durch die Lichteffekt-Steuerinformation gesteuert wird,
dadurch gekennzeichnet,
daß die Lichteffekt-Steuerinformation eine Information zur Steuerung des Farbtons, zur Steuerung der Intensität und zum Einblenden und Ausblenden, einschließlich der Geschwindigkeit des Ein- und Ausblendens, enthält.

2. Audio- und Licht-Reproduktionssystem nach Anspruch 1, bei dem die Lichtanzeigeeinrichtung aus einem Punktstrahler, einer Spiegelkugel und/oder roten, grünen und blauen Leuchten besteht.

3. Audio- und Licht-Reproduktionssystem nach Anspruch 1 oder 2, bei dem ein vorbestimmter Bereich des genannten Subkodesignals ein Benutzerbereich ist, der die Lichteffekt-Steuerinformation enthält.

4. Audio- und Licht-Reproduktionsgerät für ein System für die Wiedergabe eines Audiosignals und eines Lichteffekt-Steuersignals von einer optischen Platte nach einem der vorhergehenden Ansprüche,
mit einer Lichtsteuerung, die das Lichteffekt-Steuersignal aufnimmt, um Signale zur Steuerung des Farbtons, zur Steuerung der Intensität, zum Einblenden und Ausblenden, einschließlich der Geschwindigkeit des Ein- und Ausblendens, zu erzeugen.

Revendications

1. Système de reproduction audio et lumineuse comprenant un disque optique sur lequel un signal de synchronisation, un signal de sous-code qui contient une information de commande d'effet lumineux et des données audio sont enregistrés, dans lequel ledit disque optique doit être lu de manière à reproduire le signal audio à partir desdites données audio avec un système de reproduction audio et au moins un moyen d'affichage lumineux étant commandé par ladite information de commande d'effet lumineux, caractérisé en ce que ladite information de commande d'effet lumineux contient une information pour une commande de teinte, pour une commande d'intensité, pour une commande d'entrée en évanouissement et de sortie d'évanouissement incluant les vitesses d'entrée en évanouissement et de sortie d'évanouissement.

2. Système de reproduction audio et lumineuse selon la revendication 1, dans lequel ledit moyen de commande de lumière est une lumière de spot, un ballon à miroirs et/ou des lumières rouge, verte et bleue.

3. Système de reproduction audio et lumineuse selon la revendication 1 ou 2, dans lequel une zone prédéterminée dudit signal de sous-code est une zone utilisateur qui contient ladite information de commande d'effet lumineux.

4. Appareil de reproduction à système de reproduction audio et lumineuse pour reproduire un signal audio et un signal de commande d'effet lumineux à partir d'un disque optique selon l'une quelconque des revendications précédentes, comprenant un contrôleur de lumière qui reçoit le signal de commande d'effet lumineux afin de produire les signaux pour une commande de teinte, une commande d'intensité, une commande d'entrée en évanouissement et de sortie d'évanouissement y compris les vitesses d'entrée en évanouissement et de sortie d'évanouissement.

* C L M S *