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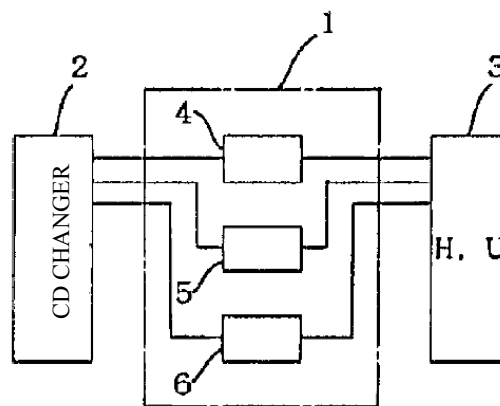
(21) Application number	Japanese Utility Model Application H4-64700	(71) Applicant	000101732 Alpine Electronics, Inc. 1-1-8 Nishi Gotanda, Shinagawa-ku, Tokyo
(22) Date of application	August 24, 1992	(72) Inventor	Kenji OUCHIDA % Alpine Electronics, Inc., 1-1-8 Nishi Gotanda, Shinagawa-ku, Tokyo

(54) [TITLE OF THE INVENTION] **BUS SYSTEM CONVERSION UNIT**

(57) [ABSTRACT]

[PURPOSE] To provide an interface unit which enables, in audio equipment for a vehicle, the additional installation of a CD changer of a Company B in a main unit of a Company A, as well as the additional installation of a CD changer of Company A in a main unit of Company B.

[CONSTITUTION] The present invention is configured to divide a signal into three series including a control system, an audio system, and a power system, and a conversion circuit is provided for each series. An interface unit 1 which connects a CD changer 2 and a main unit 3 is provided with a control system conversion part 4, an audio system conversion part 5, and a power conversion part 6. A small-scale microcomputer is employed for the control system conversion part 4, which enables bus line conversion. A differential signal/ground signal conversion is performed by using a differential amplifier and a level adjustment amplifier in the audio system conversion part 5, and a regulator is used in the power conversion part to perform voltage conversion.



[SCOPE OF THE UTILITY MODEL REGISTRATION CLAIMS]

[CLAIM 1] A bus system conversion unit in an interface unit for additionally connecting a CD changer of a different signal system to a main unit of acoustic equipment for a vehicle, wherein a signal is divided into three series including a control system, an audio system, and a power system, and a conversion circuit is provided for each series.

[BRIEF DESCRIPTION OF THE DRAWINGS]

FIG. 1 is an overall schematic block diagram of an embodiment of the present invention.

FIG. 2 is a schematic block diagram of a control system conversion part of an embodiment of the present invention.

FIG. 3 is a waveform chart of a signal of a control system

conversion part of an embodiment of the present invention.

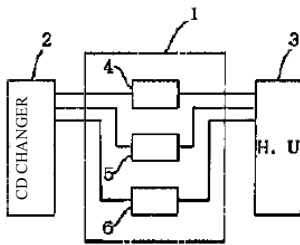
FIG. 4 is a schematic block diagram of an audio system conversion part of an embodiment of the present invention.

FIG. 5 is a schematic block diagram of a power conversion part of an embodiment of the present invention.

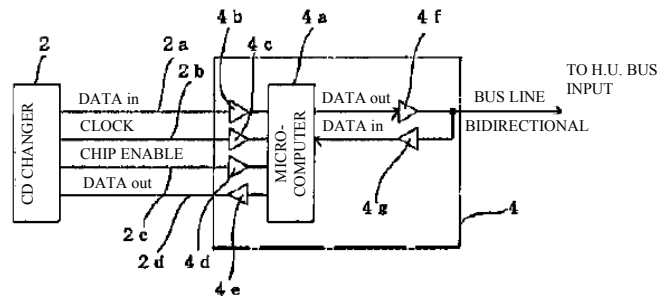
[EXPLANATION OF SYMBOLS]

- 1 interface unit
- 2 CD changer
- 3 main unit
- 4 control system conversion part
- 5 audio system conversion part
- 6 power conversion part

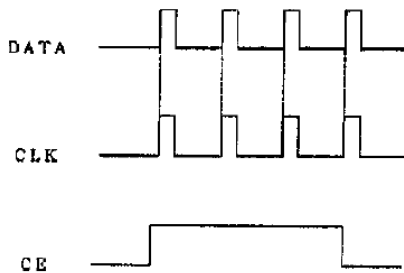
[FIG. 1]



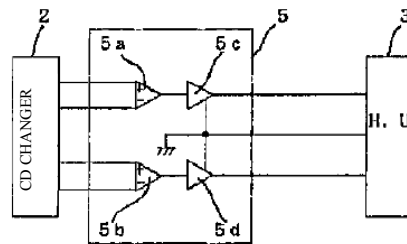
[FIG. 2]



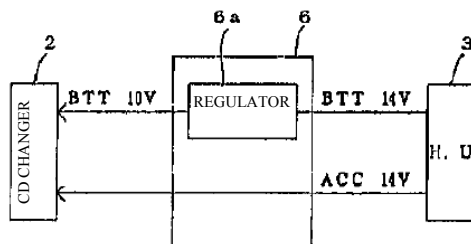
[FIG. 3]



[FIG. 4]



[FIG. 5]



[DETAILED DESCRIPTION OF THE INVENTION]

[0001]

[FIELD OF INDUSTRIAL APPLICATION]

The present invention relates to an acoustic system for a vehicle, and more particularly to a device in which a main unit of acoustic equipment for a vehicle is already mounted in an automobile or the like and a CD changer is additionally installed in the main unit, or vice versa.

[0002]

[PRIOR ART]

When an audio system is to be simultaneously mounted at the time of the purchase of an automobile, a main unit which is typically referred to as "pure" is often mounted. When a CD changer which accommodates a plurality of CDs and automatically changes and plays the CDs is to be additionally mounted, a device of the same manufacturer as the "pure" main unit is purchased and mounted because the systems of the signals connecting the respective devices differ depending on the manufacturer. In addition, when both devices that are mounted are provided by the same manufacturer and a user who is using the devices wishes to replace the main unit with one provided by Company A, for example, as an upgrade or the like, it is also necessary to simultaneously replace the CD changer with one provided by Company A for the same reason.

[0003]

[PROBLEM TO BE SOLVED BY THE INVENTION]

From the perspective of cost, this becomes a substantial financial burden to the user and drastically limits the range of merchandise options, and from the perspective of the manufacturer, this could also obstruct sales. A problem of the present invention is to enable the additional installation of a CD changer of a Company B in a main unit of a Company A, as well as the additional installation of a CD changer of Company A in a main unit of Company B.

[0004]

[MEANS FOR SOLVING THE PROBLEM]

The problem described above is solved by the present invention with an interface unit for additionally connecting a CD changer of a different signal system to a main unit of acoustic equipment for a vehicle, wherein a signal is divided into three series including a control system, an audio system, and a power system, and a conversion circuit is provided for each series.

[0005]

[OPERATION]

A small-scale microcomputer enables bus line conversion in the control system conversion part, and a differential signal voltage/ground signal voltage conversion is performed by a differential amplifier and a level adjustment amplifier in the audio conversion part, while in the power conversion part, a regulator adjusts the difference in power supply voltage, which enables the additional installation of a CD changer of a Company B in a main unit of a Company A, as well as the additional installation of a CD changer of Company A in a main unit of Company B.

[0006]

[EMBODIMENTS]

All of the drawings illustrate the present invention, and FIG. 1 is a block diagram illustrating the overall configuration thereof. Symbol 1 is the interface unit of the present invention, which converts the system of a signal or the like connecting a CD changer 2 and a main unit 3, and three conversion series are provided therein. Symbol 4 is a control conversion part for a bus line or a control signal such as a clock, 5 is an audio conversion part for an audio signal, and 6 is a power conversion part for power supply. The interface unit is configured so that the parts are linked to one another via the above three series of conversion parts.

[0007]

FIG. 2 is a detailed schematic block diagram of the control system conversion part 4, but communication via a serial data line or a Hi active or Lo active signal may be used for the control of this signal system. In addition, in the case of serial data, a clock line or chip enable (inhibit) line) may also be used. Therefore, it is necessary to provide a microcomputer or the like inside the conversion adapter so as to convert and uniform each system. That is, a microcomputer 4a is provided in the control system conversion part 4, and of the four lines from the connected CD changer 2, the microcomputer 4a is connected to a data IN line 2a via a buffer 4b, to a clock line 2b via a buffer 4c, to a chip enable line 4d via a buffer 4d, and to a data OUT line 2d via a buffer 4e.

[0008]

On the other hand, the microcomputer 4a is connected to a bidirectional bus line connected to the main unit side (not illustrated) via a buffer 4f for data OUT and a buffer 4g for data IN. Each buffer is provided for voltage matching as described above.

[0009]

FIG. 3 illustrates signal waveforms of the lines between the microcomputer 4a and the CD changer 2, wherein the data IN line 2a is a line for transmitting the operating state of the CD changer 2 of another company – that is, data such as PLAY< FWD, and BWD – and the transmitted data are processed by the microcomputer 4a. The processing content includes processing such as the conversion of 14-bit data to 16-bits or the conversion of data arrays. In addition, the clock line 2b is for synchronizing data that are read out from the data IN line 2a, and the chip enable line 2c holds timing waveforms such as those illustrated as data indicating breaks in operating state data.

[0010]

The above is one embodiment, and to further expand the range of system conversion between each of the companies, the microcomputer 4a may be provided with switches, and a connection adapter for the CD changer or the main unit may be used to enable application to various models.

[0011]

FIG. 4 is a schematic block diagram of an example of the conversion of the audio signal system. The audio system conversion part 5 is provided with differential amplifiers 5a and 5b as well as amplifiers 5c and 5d connected in series thereto. This example illustrates a case in which 200 mV differential output signals, for example, for each of L and R outputted from the CD changer 2 are respectively inputted into the differential amplifiers 5a and 5b, and the levels are adjusted by the amplifiers 5c and 5d so that the signals may be converted to 850 mV adposition-type audio signals, for example, and inputted into a main unit 3.

[0012]

FIG. 5 illustrates a schematic block diagram of an embodiment of the power conversion part. The form of the power supply of the CD changer may be one in which ACC or BTT lines are connected directly at each company or one in which the lines are

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