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(54) **Stagebox with wireless audio connector**

(57) An audio stagebox (110) has a plurality of audio connectors (121, 121a) which are configured to establish a data connection with audio equipment (190-1 - 190-5). The audio stagebox (110) comprises a wireless audio

connector (121) which is configured to establish a first data connection (131) with at least one wireless audio equipment (190-1, 190-2, 190-3) by means of wireless data transmission.

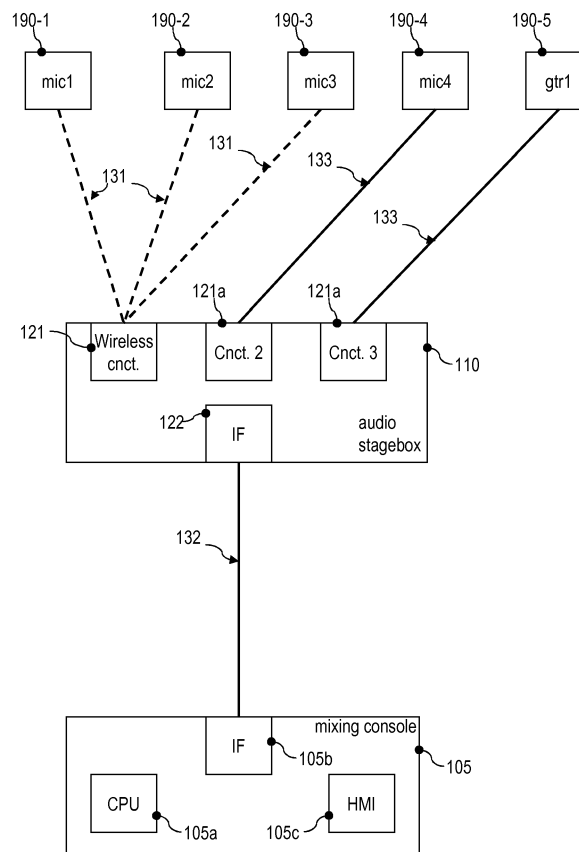


FIG.1

Description

Technical Field

[0001] Techniques of wirelessly connecting wireless audio equipment with an audio stagebox are provided. In particular, an audio stagebox comprising a wireless audio connector configured to establish a first data connection with the wireless audio equipment is provided.

Background

[0002] Mixing consoles are widely employed for processing of audio signals of different kinds and numbers. E.g., a number of input audio signals may be processed, i.e., amplified and/or mixed and/or enhanced with certain audio effects, and then output as audio output signal to one or more consuming units, such as loudspeakers or headphones or recording means. Environments where such mixing consoles find application include, but are not limited to: on-stage performances, presentations, places of worship, theaters, trade fairs, etc. Often, in such situations it is desired to provide wireless transmission to and from certain wireless audio equipment, e.g., microphones, headphones, remote amplifiers, and other audio sources. Examples for scenarios where wireless transmission is desired include the provisioning of microphones or headphones which are wirelessly connected to the mixing console.

[0003] However, in applications such as those named above, a robust and fail-safe connection between the mixing console and the wireless audio equipment is typically of importance. Losing connection to a remote unit may result in unwanted effects. However, often the mixing console and the remote units are positioned at a large distance to each other such that the wireless transmission needs to cover this distance. Also, sometimes they are placed in an environment where wireless transmission is inhibited by obstacles.

[0004] Therefore, a need exists to provide wireless transceiving between wireless audio equipment and a mixing console having increased transmission reliability.

Summary

[0005] This need is met by the features of the independent claims. The dependent claims define embodiments.

[0006] According to an aspect, an audio stagebox having a plurality of audio connectors is provided. The audio connectors are configured to establish a data connection with audio equipment. The audio stagebox is configured to interface the audio equipment with a mixing console. The audio stagebox comprises a wireless audio connector which is configured to establish a first data connection with at least one wireless audio equipment by means of wireless data transmission. Further, the wireless audio connector is configured to receive audio data from the at

least one wireless audio equipment via the first data connection. The audio stagebox further comprises a data interface which is configured to establish a second data connection with the mixing console. The data interface is further configured to forward the audio data to the mixing console via the second data connection.

[0007] A wired further data connection may be present between the wireless audio connector and the data interface. This wired further data connection may, in other words, internally connect the wireless audio connector with the data interface. E.g., the first data connection may employ wireless transmission, e.g., according to a proprietary standard or, e.g., according to the Wireless Local Area Network (WLAN) Standard 802.11 of the Institute of Electrical and Electronics Engineers (IEEE). The second data connection may employ fixed-line or wireless transmission, e.g., according to a proprietary standard or, e.g., Ethernet standard 802.3 of the IEEE.

[0008] E.g., the further data connection may comprise to data channels, e.g., a first data channel for forwarding the audio data between the wireless audio connector and the data interface, and a second data channel for control data. E.g., via the second data channel it may be possible to determine the presence and / or identity of the wireless audio connector in the audio stagebox which may be of particular importance if the latter is releasably mounted.

[0009] The audio data may be digital audio. Various types of encoding of the audio data may be employed, e.g., differently or the same for the first and second data connections. E.g., the second data connection may operate according to a multichannel digital audio protocol, wherein each audio equipment is associated with at least one channel of the multichannel digital audio protocol. E.g., the multichannel digital audio protocol may be a time-division multiplex protocol, wherein a transmission frame of the multichannel digital audio protocol comprises a plurality of data blocks. Each data block may carry payload of the audio data of a given channel. E.g., the audio data may be transmitted via the second data connection employing the Multi Channel Audio Digital Interface (MADI) standard AES 10-2003 by the Audio Engineering Society (AES).

[0010] The first data connection and/or the second data connection may be configured for unidirectional transmission of data and/or audio data from the audio equipment to the stagebox, and from the stagebox to the mixing console, respectively - or vice versa. It is also possible that the first data connection and/or the second data connection are configured for bi-directional data connection.

[0011] E.g., the audio stagebox may comprise fixed-line audio connectors which include sockets or plugs for the physical connection with an inter-related plug or socket of a cable. The wireless audio connector may comprise one or more antennas which can be arranged inside or outside of a housing of the audio stagebox. The wireless audio connector may comprise dedicated hardware, e.g., a circuit board, or may be implemented at least partly as software, e.g., being executed on a main processor

and/or a shared processor. The wireless audio equipment may be selected from the group comprising: microphone, amplifier, electrical instrument.

[0012] The audio stagebox may also be referred to as a compact connector hub. The audio stagebox may be seen as an extension to the mixing console. Instead of connecting each audio equipment directly to the mixing console, by means of the audio stagebox it becomes possible to connect the audio equipment to the audio stagebox and then provide, e.g., a single connection to the mixing console where the data to be transmitted for each audio equipment is multiplexed onto the second data connection. This reduces the need for cables. Further, it allows for easy connection of audio equipment to the mixing console via the audio stagebox. The point of connection can be closer to the audio equipment. Further, the placing of the audio stagebox may be versatile; the audio stagebox may be comparably portable. The audio stagebox may have smaller outer dimensions if compared to the mixing console. It may be possible to place the audio stagebox in closer proximity to the audio equipment than the mixing console, e.g., on-stage or close to the stage where the performance is ongoing.

[0013] In various reference implementations, it is known to provide a wireless audio connector as part of the mixing console, see, e.g., EP 2 629 440 A1. Typically, the distance between the wireless audio connector and the wireless audio equipment is larger in such a scenario if compared to the present solution where the wireless audio connector is provided as part of the stagebox. In other words, the distance which needs to be covered by wireless transmission may be reduced. Thereby, transmission reliability may be increased.

[0014] In such a manner, the audio stagebox may serve as an interface between the audio equipment and the mixing console. Interfacing may relate to: receiving the audio data from the audio equipment and forwarding the audio data towards the mixing console. In other words, the majority of the data handling may occur in the mixing console, e.g., mixing, adding audio effects, and/or amplifying. However, it is also possible that, to some smaller or larger degree, audio processing occurs in the audio stagebox. In particular, the audio stagebox may multiplex the audio data of the audio equipment for transmission via the second data connection. It may also be possible that the audio stagebox compresses or otherwise modifies the audio data before forwarding the audio data to the mixing console.

[0015] The operation of the audio stagebox may be remote controlled from the mixing console. In other words, the audio stagebox may execute commands received from the mixing console, e.g., as part of control data. E.g., various operational parameters of the audio stagebox may be set by a user of the mixing console via a human-machine-interface (HMI) and sent to the audio stagebox via the second data connection.

[0016] The data interface may be further configured to transceive control data via the second data connection,

the control data including parameters of operation of the wireless audio connector and/or of the at least one wireless audio equipment.

[0017] In other words, the control data may be sent from the audio stagebox to the mixing console and/or vice versa. The control data may carry telemetry information. By such means, the wireless audio connector and/or the stagebox may be remote controlled by a user of the mixing console, e.g., via a respective HMI. E.g., various parameters of operation may be checked and set such as transmission strength, diversity, and mute status. For checking, current values of the operational parameters may be sent to the mixing console; for setting, set values of the operational parameters may be sent to the audio stagebox. E.g., the parameters of operation may be selected from the group comprising: a wireless channel of the first data connection; an operating frequency of the first data connection; a signal strength of the first data connection; an identification tag of the audio equipment; a battery status of the audio equipment; a diversity of the first data connection; a mute status of the audio equipment.

[0018] I.e., some of the parameters may relate directly to the wireless audio connector of the audio stagebox; some of the parameters may additionally or alternatively relate to the wireless audio equipment which is wirelessly connected to the wireless audio connector. The wireless audio connector may be configured to send and/or receive (transceive) at least parts of the control data via the first data connection.

[0019] In such a manner, it may in particular be expendable to provision a respective HMI at the wireless audio connector and/or the wireless audio equipment. This may reduce the complexity of the system. Further, it may be more convenient for a user to control the operation of the wireless audio connector and/or of the wireless audio equipment by operating the HMI of the mixing console; this may relieve the user from the need to check operation parameters directly at the place of the audio stagebox and/or of the wireless audio equipment which may be remote from the mixing console.

[0020] E.g., the control data may be transmitted employing a particular data encoding. The data encoding may be according to a proprietary standard. The data interface may also be configured to transceive the control data as payload of a predetermined channel of the multichannel digital audio protocol. In other words, the control data may be transmitted via an audio-specific data encoding protocol. This may simplify the data transmission via the second data connection, because there may be no need to provision different protocols for the control data and the audio data. Further, a respective data interface of the mixing console configured to receive and transmit data via the second data connection may be reduced in complexity, as it may not be required to operate according to further encoding protocols.

[0021] The wireless audio connector may be fixedly installed in the audio stagebox. However, it is also pos-

sible that the wireless audio connector is releasably mounted in the audio stagebox, e.g., is interchangeable with further equipment of the audio stagebox. E.g., the audio stagebox may comprise a docking bay which is configured to releasably mount an option module which includes the wireless audio connector. The docking bay may be arranged on a front side or on a back side of the audio stagebox. E.g., a plurality of fixed-line audio connectors may be situated on the front side of the audio stagebox. The docking bay may be situated on the back side of the audio stagebox. The front side and the back side may be opposite to each other.

[0022] E.g., when the option module is inserted into the docking bay, first the internal wired further data connection between the wireless audio connector and the data interface may be established. Subsequently, the first data connection may be established between the wireless audio connector and the at least one wireless audio equipment. E.g., via the second data channel of the further data connection, it may be repeatedly checked whether the option module is mounted or not. Once mounted, the first data channel and the first data connection may be established to transmit the audio data.

[0023] E.g., the option module may comprise at least one antenna for establishing the wireless data transmission. The at least one antenna may project from an outer surface of the audio stagebox when the option module is mounted in the docking bay. In other words, the antennas may extend beyond edges of the audio stagebox. Thereby, the transmission reliability of the data connection may be increased. In particular, the at least one antenna may be remote from an outer surface of the audio stagebox and, therefore, from certain metallic parts of the audio stagebox. In other words, the at least one antenna may be arranged spaced apart from the outer surface of the audio stagebox.

[0024] The option module and/or the docking bay may comprise locking means to secure the option module when mounted within the docking bay. The option module may comprise sockets and/or plugs and the docking bay may comprise inter-related plugs and/or sockets which engage with each other when the option module is mounted in the docking bay.

[0025] The audio stagebox may comprise a power supply and the docking bay may comprise a power connector configured to provide electrical power from the power supply to the option module when the option module is mounted in the docking bay. Thereby, it may be expendable to provision a dedicated power supply as part of the option module. The option module may be less complex and comparably lightweight.

[0026] According to a further aspect, a mixing console for mixing a plurality of audio data is provided. The mixing console is configured to interface with an audio stagebox which has a plurality of audio connectors. The plurality of audio connectors is configured to establish a data connection with audio equipment. The mixing console comprises a mixing console data interface configured to es-

tablish a data connection with the audio stagebox and to receive audio data from at least one wireless audio equipment via the data connection. The at least one wireless audio equipment is wirelessly connected via a wireless audio connector with the audio stagebox.

[0027] In other words, the mixing console may be inter-related with the audio stagebox according to a further aspect of the present invention.

[0028] The mixing console data interface may be further configured to transceive control data. The control data may include parameters of operation of the wireless audio connector and/or of the audio equipment.

[0029] The mixing console may further comprise an HMI for interfacing with a user. The HMI may be configured to determine at least some of the parameters of operation from user input and/or may be configured to output at least some of the parameters of operation to the user. E.g., the HMI may comprise a display, e.g., a touch-sensitive display, and/or actuation elements such as sliders, rotary knobs, buttons, etc., and/or voice output/input. The HMI may comprise displaying a menu structure including menus and sub-menus and functions to be executed on the display.

[0030] For such a mixing console, effects may be achieved which are comparable to the effects which may be achieved for an audio stagebox according to a further aspect.

[0031] According to a further aspect, a method of interfacing at least one wireless audio equipment with a mixing console is provided. The method comprises a wireless audio connector of an audio stagebox establishing a first data connection with the at least one wireless audio equipment by means of wireless data transmission. The audio stagebox is remote from the mixing console. The method further comprises the wireless audio connector receiving audio data from the at least one wireless audio equipment via the first data connection. The method further comprises a data interface of the audio stagebox establishing a second data connection with the mixing console and forwarding the audio data to the mixing console via the second data connection.

[0032] The method may further comprise the data interface transceiving control data via the second data connection. The control data may include parameters of operation of the wireless audio connector and/or of the at least one wireless audio equipment.

[0033] For such a method, effects may be obtained which are comparable to the effects that may be obtained for the audio stagebox according to a further aspect.

Brief description of the Drawings

[0034] The foregoing and other features of embodiments will become more apparent from the following detailed description of the embodiments when read in conjunction with the accompanying drawings.

FIG. 1 is a schematic illustration of an audio stage-

box, a mixing console, and audio equipment connected to the audio stagebox.

FIG. 2 is a front view of the audio stagebox according to various embodiments.

FIG. 3 is a front view of the audio stagebox according to various embodiments.

FIG. 4 illustrates a multichannel digital audio protocol.

FIG. 5 is a flowchart of a method of interfacing at least one wireless audio equipment with a mixing console according to various embodiments.

Detailed description

[0035] In the drawings, like reference numerals denote like elements. The drawings are to be regarded as being schematic representations of embodiments, and elements illustrated in the drawings are not necessarily shown to scale. Rather, the various elements are represented such that their function and general purpose become apparent to a person skilled in the art. Functional blocks or elements may be implemented as hardware, software, firmware, or a combination thereof.

[0036] Hereinafter, various techniques of wirelessly interfacing wireless audio equipment, e.g., a microphone, with a mixing console are presented. In particular, a first data connection by means of wireless data transmission is established between a wireless audio connector of an audio stagebox and the wireless audio equipment. The audio stagebox forwards audio data received via the first data connection to the mixing console.

[0037] Typically, a distance between the audio stagebox and the wireless audio equipment is smaller than a distance between the mixing console and the wireless audio equipment. This may allow increasing the transmission reliability of the first data connection.

[0038] In FIG. 1, an audio stagebox 110 is shown which is configured to interface audio equipment 190-1 - 190-5 with a mixing console 105. For this, the audio stagebox 110 has a plurality of audio connectors 121, 121a that are configured to establish a data connection with the audio equipment 190-1 - 190-5. In particular, the audio connectors 121a establish a data connection by means of fixed-line data transmission; respectively, the wireless audio connector 121 establishes a first data connection 131 with the wireless audio equipment 190-1, 190-2, 190-3 by means of wireless data transmission (shown as dashed lines in FIG. 1). Audio data is received by the wireless audio connector 121 from the wireless audio equipment 190-1, 190-2, 190-3 via the first data connection 131. E.g., the wireless audio equipment 190-1, 190-2, 190-3 can be selected from the group comprising: microphone, amplifier, electrical instrument.

[0039] The audio stagebox 110 further comprises a da-

ta interface 122 which is configured to establish a second data connection 132 with the mixing console 105. The data interface 122 forwards the audio data which is received from the audio equipment 190-1 - 190-5 via the second data connection 132. The second data connection 132, in the scenario of FIG. 1, is implemented by means of fixed-line data transmission; however, it should be understood that the second data connection 132 can also be implemented by means of wireless data transmission - in the latter case the audio stagebox 110 can function as a repeater for the data transmission between the wireless audio equipment 190-1, 190-2, 190-3 and the mixing console 105.

[0040] Internal wired further data connections (not shown in FIG. 1) may be present between the data interface 122 and the connectors 121, 121a. The further data connections may comprise one or more data channels, e.g., separate channels for control data and audio data. All such data may be multiplexed on the second data connection 132. E.g., these data channels of the further data connection may be implemented as separate physical connections or may be implemented as a multiplex protocol, as well.

[0041] Optionally, the audio stagebox 110 may comprise a processor which processes the audio data before sending it on to the mixing console 105. E.g., the processor may comprise or digitize the audio data.

[0042] The mixing console 105 comprises a mixing console data interface 105b. The mixing console data interface 105b is configured to establish the second data connection 132 with the audio stagebox 110 and to receive the audio data. In other words, the data interface 122 and the mixing console data interface 105b are inter-related. Further, the mixing console 105 comprises a processor 105a which is configured to process the received audio data; processing may relate to mixing, applying audio effect, routing, and/or amplifying. The processed audio data can be output via outputs of the mixing console 105 (not shown in FIG. 1). The mixing console 105 further comprises an HMI 105c for interfacing with the user of the mixing console. The HMI 105c is configured to determine at least some parameters of operation of the audio stagebox 110 and/or of the audio equipment 190-1 - 190-5. In particular, the HMI 105c is configured to determine at least some parameters of operation of the wireless audio connector 121 and/or of the wireless audio equipment 190-1, 190-2, 190-3. These parameters of operation are sent as control data via the second data connection 132 to the audio stagebox 110 and processed there and/or executed by the audio stagebox 110 and/or forwarded towards the respective audio equipment 190-1 - 190-5. Thereby, a user of the mixing console 105 can remote control operation parameters of the audio stagebox 110 and/or of the audio equipment 190-1 - 190-5. In particular, a user of the mixing console 105 can control operation of the wireless audio connector 121.

[0043] The remote control can be implemented with respect to the various parameters of operation. E.g., the

parameters of operation may be selected from the group comprising: a wireless channel of the first data connection 131; an operating frequency of the first data connection 131; a signal strength of the first data connection 131; an identification tag of the audio equipment; a battery status of the audio equipment 190-1 - 190-5; a diversity of the first data connection 131; and a mute status of the audio equipment 190-1 - 190-5.

[0044] In other words, some of the parameters of operation may relate to the operation of the wireless audio connector 121, while other parameters of operation may relate to the operation of the wireless audio equipment 190-1 - 190-3 and/or of the fixed-line audio equipment 190-4, 190-5. In this regard, the wireless audio connector 121 is configured to transceive at least parts of the control data via the first data connection 131, i.e., forward at least parts of the control data to the wireless audio equipment 190-1 - 190-3. Then, the wireless audio connector 121 and/or the wireless audio equipment 190-1-190-3 can be remote controlled.

[0045] Such a remote control can make it unnecessary to provide an HMI at the audio stagebox 110. This makes it possible to provide the audio stagebox 110 with comparably small outer dimensions. In particular, the audio stagebox 110 may be smaller if compared to the mixing console 105. This makes it possible to provide the audio stagebox 110 on-stage, i.e., in close proximity to the audio equipment 190-1 - 190-5. Then the fixed-line data connection 133 may be comparably short. Also, the distance covered by the wireless data transmission of the first data connection 131 may be comparable short; this increases transmission reliability of the wireless data transmission. However, it is also possible to provide actuation elements at the audio stagebox 110, e.g. for switching on/off, testing, etc.

[0046] As can be seen from FIG. 1, the audio stagebox 110 serves as a hub for the connecting the plurality of audio equipment 190-1 - 190-5 with the mixing console 105. Typically, the audio data of the various audio equipment 190-1 - 190-5 are transceived and processed as part of different channels. E.g., the second data connection 132 can operate according to a multichannel digital audio protocol. Each audio equipment 190-1 - 190-5 may be associated with at least one channel of the multichannel audio protocol. E.g., the MADI audio protocol can be employed. Then the various channels, i.e., the audio data of the various audio equipment 190-1 - 190-5, can be transferred in a multiplexed manner via the second data connection 132. However, it should be understood that the processor 105a of the mixing console 105 can process the various audio channels individually.

[0047] As can be seen from the above, it is possible that a dedicated audio protocol is employed for the transmission of audio data via the second data connection 132. It is possible that the control data is transceived by employing a different transmission protocol than employed for the audio connection; however, it is also possible that the control data is received as part of the pro-

ocol employed for the transmission of the audio data, e.g., the multichannel audio digital protocol. E.g., the data interface 122 can be configured to transceive the control data as payload of a predetermined channel of the multichannel digital audio protocol. In other words, while various channels of the multichannel digital audio protocol are conventionally assigned to audio data of the various audio equipment 190-1 - 190-5, the multichannel digital audio protocol can also be employed for the transmission of the non-audio control data. This may simplify the operation of the data interface 122 and of the mixing console data interface 105b.

[0048] In FIG. 2, a front view of the audio stagebox 110 is shown. As can be seen from FIG. 2, the audio stagebox 110 comprises a plurality of fixed-line audio connectors 121a which are formed as sockets or plugs. Further, a plug of the fixed-line data transmission of the data interface 122 is shown.

[0049] In the scenario of FIG. 2, the wireless audio connector 121 is an integral part of the audio stagebox 110 and is, to a large degree, housed internally, i.e., within an outer housing of the audio stagebox 110. The wireless audio connector 121 comprises two antennas which project beyond the outer edges of the audio stagebox 110. This increases the transmission reliability, as better reception becomes possible when the antennas 121 are at some distance with respect to, e.g. metallic parts of the audio stagebox 110.

[0050] In FIG. 3, a scenario is shown where the audio stagebox 110 comprises a docking bay 310 which is configured to releasably mount an option module 320 which includes the wireless audio connector 121. In the scenario of FIG. 3, the docking bay 310 is arranged on the front side of the audio stagebox 110. However, it should be understood that it is also possible that the docking bay 310 is located on a back side of the audio stagebox 110 which is opposite to the front side. As can be seen from FIG. 3, the option module 320 comprises an antenna for establishing the wireless data transmission. The antenna projects from an outer surface of the audio stagebox 110 when the option module 320 is mounted in the docking bay 310. This can further increase the transmission reliability. E.g., the audio stagebox 110 can comprise a power supply and the docking bay 310 can comprise a power connector configured to provide electrical power from the power supply to the option module 320 when the latter is mounted in the docking bay 310. This can allow to fabricate the option module with comparably small dimensions and comparably lightweight as it may be expendable to provide a dedicated power supply within the option module 320.

[0051] In FIG. 4, details of the multichannel digital audio protocol 410 which is employed for transmitting audio data 415 and control data 420 via the second data connection 132 are illustrated. As can be seen, various audio channels relating to the various audio equipment 190-1 - 190-5 are multiplexed in time within a transmission frame. In the scenario of FIG. 4, 55 channels are provid-

ed. The third channel carries payload which is the control data 420. Such a protocol may be employed bi-directionally between the mixing console 115 and the audio stagebox 110.

[0052] In FIG. 5, a flowchart of a method of interfacing the wireless audio equipment 190-1-190-3 with the mixing console 105 is illustrated. The method starts with step S1. In step S2, the first data connection 131 between the wireless audio connector 121 and the wireless audio equipment 190-1 - 190-3 is established. Next, in step S3, audio data is received by the wireless audio connector 121 from the wireless audio equipment 190-1 - 190-3 via the first data connection 131. Then, in step S4, the audio data is forwarded to the mixing console 105 via the second data connection 132. The method ends with step S5.

[0053] Although the invention has been described with respect to certain preferred embodiments, equivalents, combinations, and modifications will occur to others skilled in the art upon the reading and understanding of the specification. The present invention includes all such equivalents, combinations, and modifications and is limited only by the scope of the appended claims.

Claims

1. An audio stagebox (110) having a plurality of audio connectors (121, 121a) configured to establish a data connection with audio equipment 190-1 - 190-5, the audio stagebox (110) being configured to interface the audio equipment (190-1 - 190-5) with a mixing console (105),
the audio stagebox (110) comprising:

- a wireless audio connector (121) configured to establish a first data connection (131) with at least one wireless audio equipment (190-1, 190-2, 190-3) by means of wireless data transmission, and
further configured to receive audio data (415) from the at least one wireless audio equipment (190-1, 190-2, 190-3) via the first data connection (131),
- a data interface (122) configured to establish a second data connection (132) with the mixing console (105) and to forward the audio data (415) to the mixing console (105) via the second data connection (132).

2. The audio stagebox (110) of claim 1,
wherein the second data connection (132) operates according to a multichannel digital audio protocol (410),
wherein each audio equipment (190-1 - 190-5) is associated with at least one channel of the multichannel digital audio protocol (410).
3. The audio stagebox (110) of claims 1 or 2,

wherein the data interface (122) is further configured to transceive control data (420) via the second data connection (132), the control data (420) including parameters of operation of the wireless audio connector (121) and/or of the at least one wireless audio equipment (190-1, 190-2, 190-3).

4. The audio stagebox (110) of claims 2 and 3,
wherein the data interface (122) is configured to transceive the control data (420) as payload of a predetermined channel of the multichannel digital audio protocol (410).
5. The audio stagebox (110) of claims 3 or 4,
wherein the wireless audio connector (121) is configured to transceive at least parts of the control data (420) via the first data connection (131).
6. The audio stagebox (110) of any one of the claims 2 - 5,
wherein the parameters of operation are selected from the group comprising:

- a wireless channel of the first data connection (131);
- an operating frequency of the first data connection (131);
- a signal strength of the first data connection (131);
- an identification tag of the audio equipment (190-1 - 190-5);
- a battery status of the audio equipment (190-1 - 190-5);
- a diversity of the first data connection (131); and
- a mute status of the audio equipment (190-1 - 190-5).

7. The audio stagebox (110) of any one of the preceding claims, further comprising:

- a docking bay (310) configured to releasably mount an option module (320) which includes the wireless audio connector (121).

8. The audio stagebox (110) of claim 7,
wherein a plurality of fixed-line audio connectors (121a) is situated on a front side of the audio stagebox (110),
wherein the docking bay (310) is situated on a back side of the audio stagebox (110),
the front side and the back side being opposite to each other.

9. The audio stagebox (110) of claims 7 or 8,
wherein the option module (320) comprises at least one antenna for establishing the wireless data transmission,

the at least one antenna projecting from an outer surface of the audio stagebox (110) when the option module (320) is mounted in the docking bay (310).

- 10.** The audio stagebox (110) of any one of claims 7 - 9, wherein the audio stagebox (110) comprises a power supply, wherein the docking bay (310) comprises a power connector configured to provide electrical power from the power supply to the option module (320) when the option module (320) is mounted in the docking bay (310).

- 11.** A mixing console (105) for mixing a plurality of audio data (415), the mixing console (105) being configured to interface with an audio stagebox (110) having a plurality of audio connectors (121, 121a) configured to establish a data connection with audio equipment (190-1 - 190-5), the mixing console (105) comprising:

- a mixing console data interface (105b) configured to establish a data connection (132) with the audio stagebox (110) and to receive audio data (415) from at least one wireless audio equipment (190-1, 190-2, 190-3) via the data connection (132), the at least one wireless audio equipment (190-1, 190-2, 190-3) being wirelessly connected via a wireless audio connector (121) with the audio stagebox (110).

- 12.** The mixing console (105) of claim 11, wherein the mixing console data interface (105b) is further configured transceive control data (420), the control data (420) including parameters of operation of the wireless audio connector (121) and/or the audio equipment (190-1 - 190-5).

- 13.** The mixing console (105) of claims 11 or 12, further comprising:

- a human-machine-interface (105c) for interfacing with a user, the human-machine-interface (105c) being configured to determine at least some of the parameters of operation from user input and/or to output at least some of the parameters of operation to the user.

- 14.** A method of interfacing at least one wireless audio equipment (190-1, 190-2, 190-3) with a mixing console (105), the method comprising:

- a wireless audio connector (121) of an audio stagebox (110) establishing a first data connection (131) with the at least one wireless audio equipment (190-1, 190-2, 190-3) by means of wireless data transmission, the audio stagebox (110) being remote from the mixing console

(105),

- the wireless audio connector (121) receiving audio data (415) from the at least one wireless audio equipment (190-1, 190-2, 190-3) via the first data connection (131),
- a data interface (122) of the audio stagebox (110) establishing a second data connection (132) with the mixing console (105) and forwarding the audio data (415) to the mixing console (105) via the second data connection (132).

- 15.** The method of claim 14, further comprising:

- the data interface (122) transceiving control data (420) via the second data connection (132), the control data (420) including parameters of operation of the wireless audio connector (121) and/or of the at least one wireless audio equipment (190-1, 190-2, 190-3).

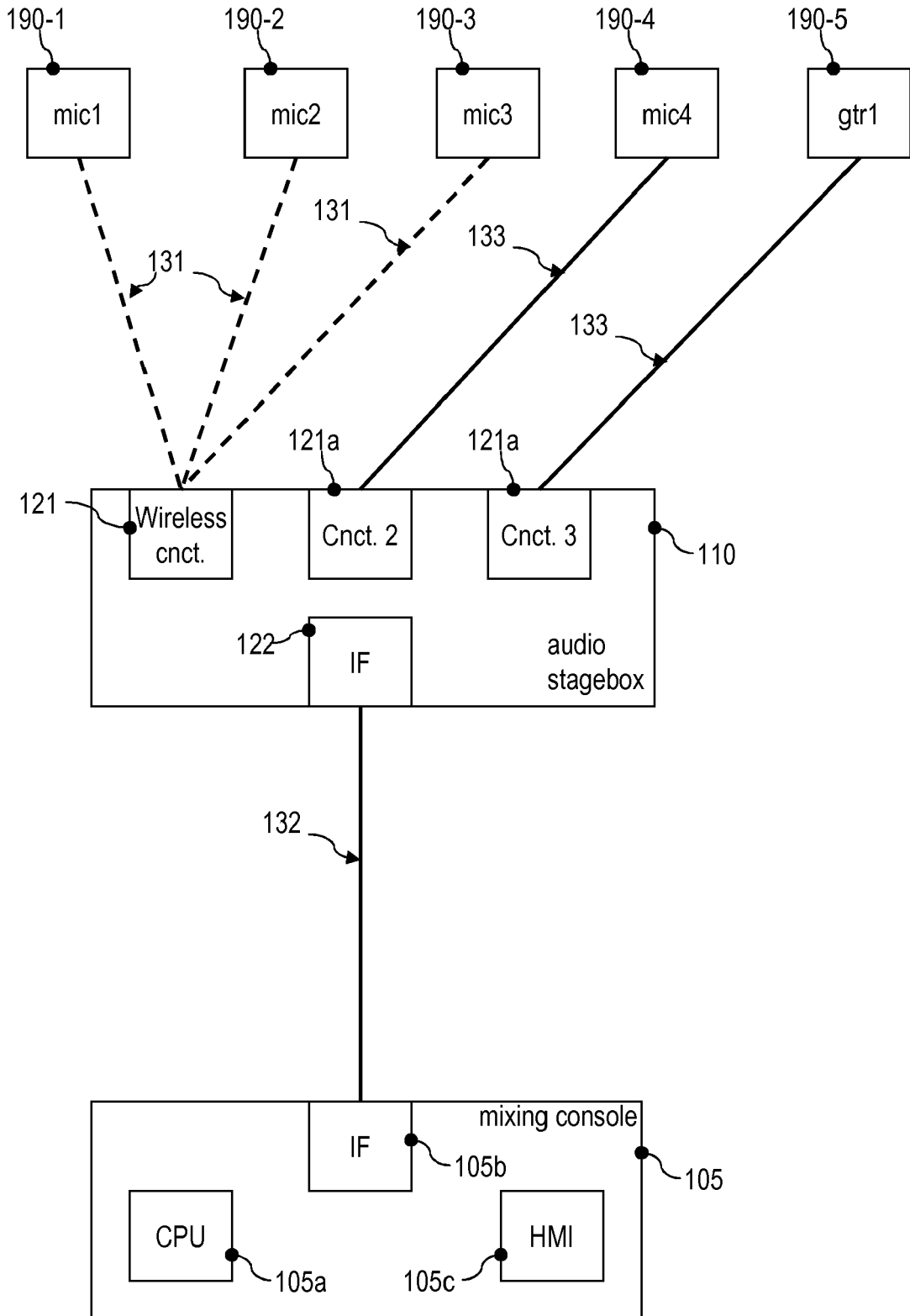
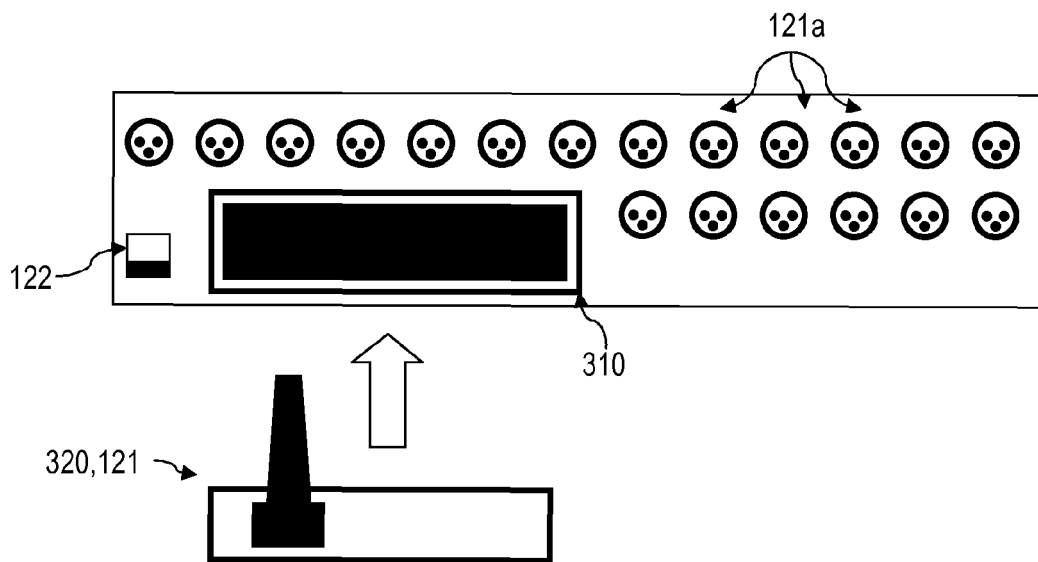
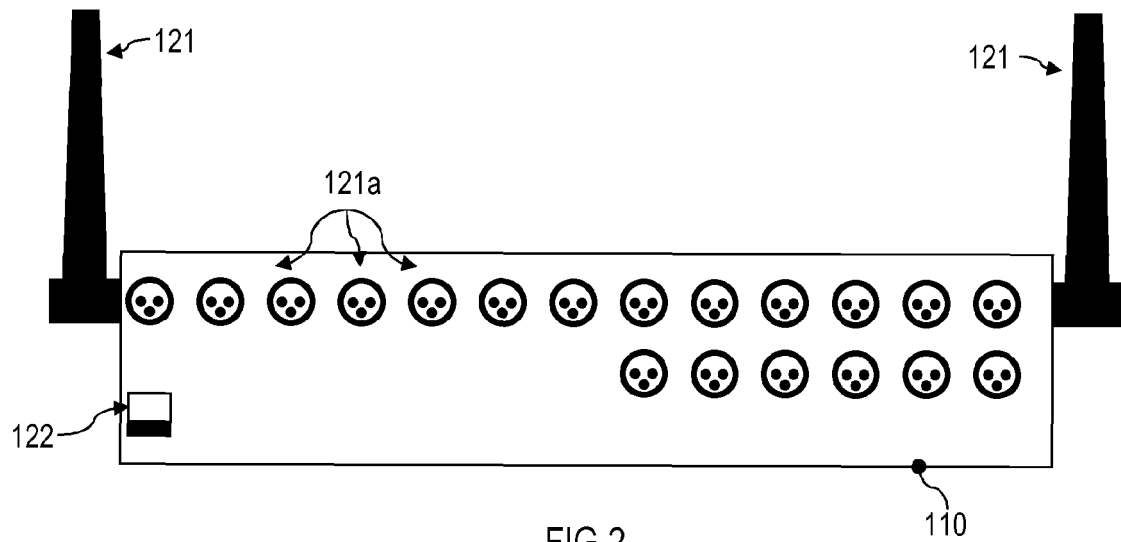


FIG.1



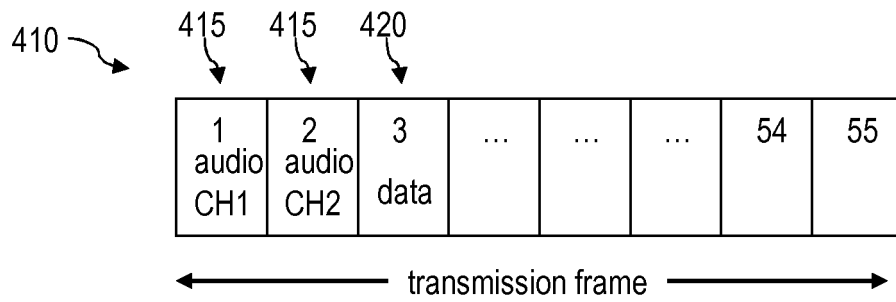


FIG.4

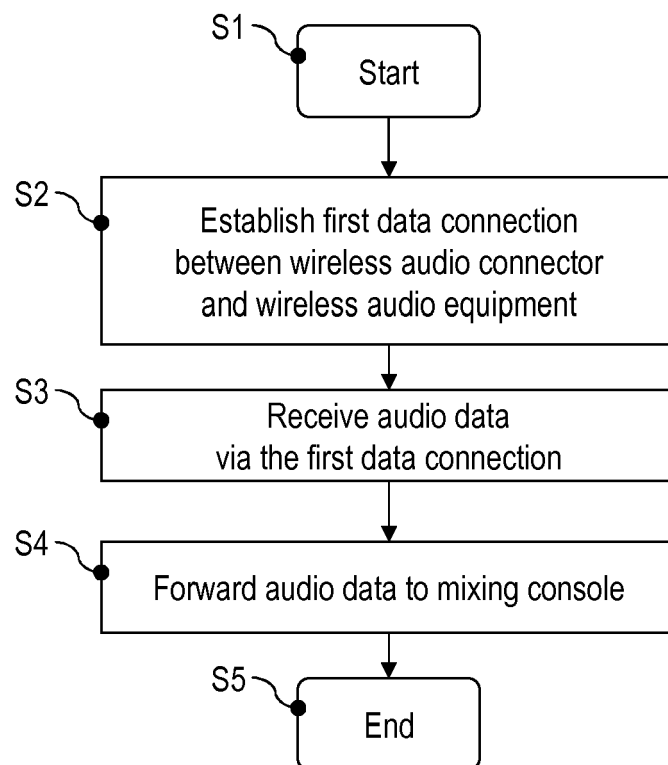


FIG. 5



EUROPEAN SEARCH REPORT

Application Number
EP 14 15 5149

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2012/299937 A1 (BROWN ANDY [GB] ET AL) 29 November 2012 (2012-11-29)	1,3,5,6, 11-15	INV. H04H60/04
Y	* paragraphs [0046] - [0048] * * paragraph [0054] * * paragraph [0056] * * paragraphs [0061] - [0064] * * paragraph [0073] * * figures 1,4 *	2,4,7-10	
Y	US 4 922 536 A (HOQUE TAREQ I [US]) 1 May 1990 (1990-05-01) * column 3, line 50 - column 4, line 5 * * column 4, lines 30-41 *	2,4	
Y,D	EP 2 629 440 A1 (HARMAN INTERNAT IND LTD [GB]) 21 August 2013 (2013-08-21) * column 3, lines 33-41 * * column 3, line 42 - column 4, line 1 * * column 5, lines 11-14 * * column 6, lines 26-28 * * column 9, lines 37-41 *	7-10	
			TECHNICAL FIELDS SEARCHED (IPC)
			H04H
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		16 July 2014	Pantelakis, P
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 14 15 5149

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16-07-2014

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2012299937 A1	29-11-2012	CA 2770693 A1	30-09-2012
		CN 102739332 A	17-10-2012
		EP 2506464 A1	03-10-2012
		JP 2012213154 A	01-11-2012
		KR 20120112168 A	11-10-2012
		US 2012299937 A1	29-11-2012

US 4922536 A	01-05-1990	NONE	

EP 2629440 A1	21-08-2013	EP 2629440 A1	21-08-2013
		US 2013208954 A1	15-08-2013

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 2629440 A1 [0013]