The invention relates to a sound unit for communication with the internet, comprising a processor, a communication circuit and connected with the processor, an amplifier and a loudspeaker, wherein the communication circuit and the processor are adapted for reception and decoding sound signals from a predetermined server only, for supplying the sound signals to the amplifier and for reception of audio clock signals and system clock synchronising signals from the server. The invention also relates to a loudspeaker box as a part of said sound unit, a digital computing unit, adapted for communication with the internet and with such a loudspeaker box, a digital system for distribution of sound signals through the internet, comprising a server to be connected to such a sound unit, and to a method of distributing sound through the internet, wherein the same sound is supplied simultaneously and synchronized to at least two different sound units.
The present invention relates to a sound unit adapted for communication with the internet, comprising a processor, a communication circuit adapted for communication with the internet and connected with the processor, an amplifier connected with the processor and at least one loudspeaker connected with the amplifier.

Such sound units are known as a kind of 'digital radio's’ having a structure comparable to that of a conventional analogue radio. These radios are adapted to be connected to several servers or 'transmitters' in radio terms, thus forming a digital form of broadcasting.

This prior art system does not offer the possibility of choice of the music or other sound one should wish to listen to. To this end so called music on demand services, such as Spotify, Apple Music or I-Tunes are available. However these services only offer music or sound and they do not provide for further enhancement of the experience of the sound.

The aim of the present invention is to provide an apparatus which allows the enjoyment of the same sound, such as music, simultaneously with friends elsewhere.

Consequently the present invention provides a sound unit of the kind referred to above, wherein the communication circuit and the processor are adapted for reception and decoding sound signals from a predetermined server only, for supplying the decoded sound signals to the amplifier to reproduce of these sound signals through the amplifier and the loudspeaker and for reception of audio clock signals and system clock signals from the server.

For the transfer of sound information standard compression formats are used., such as the formats used by streaming services such as Spotify® or Apple Music®. The digital formats used for the transfer of audio information require a clock signal to allow a proper reconstruction of the analogue audio signal and this clock signal is referred to as the audio clock signal. Further the connection to a single server by multiple sound units requires synchronisation to allow simultaneously enjoyment of sound, such as music.
Hence the audio signal is also accompanied by a system clock signal to allow simultaneous reproduction of sound by different sound units. The system clock signal may comprise a time stamping signal. The server sending the system clock signals can be the content server, a separate server, a smart phone or any other item in the network.

It is noted that the exchange of signals takes place via the internet, so that the signals need to be digital and need to have the form of addressed packets. The structure of the internet provides different transport speeds to the information packets of the signals representing the sound. As stated before the digital audio signals comprise and audio clock signal to allow proper reconstruction of the analogue audio signal. Although these audio clock signals provide synchronisation within the signal itself, it cannot provide simultaneous reproduction of sound signals on different locations, due to the different travel time of the signals over the internet. Consequently the audio signal sent by the server is also accompanied by a system clock signal . Preferably the system clock signal has a time reference, either relative, for instance to the time of sending, or absolute, but other principles to allow synchronised reproduction of the sound are not excluded.

Further it is noted that in some embodiments to be discussed further, the sound unit is adapted to reproduce video content as well, so that in such cases the audio signal forms part of a content signal, which also comprises a video signal and the system clock signal relates to the video signal as well, to allow simultaneous reproduction of audio and video signals. Preferably the system clock signal and the audio clock signal are synchronised by the 'Network Time Protocol' (NTP) or the 'Precision Time Protocol' (PTP) or comparable protocols.

The sound unit may be formed by a loudspeaker box, comprising the processor, the communication circuit, the amplifier and the at least one loudspeaker. Herein the communication circuit thereof is adapted for connection with the internet, either through a wifi network, a wired network or directly via wireless internet such as a 3G or 4G network.

Alternatively the sound unit may be formed by a loudspeaker box and a separate digital computing unit connected to the loudspeaker box, the loudspeaker box comprising the processor, the amplifier and the at least one loudspeaker, and the digital computing unit comprising the communication circuit. In this embodiment the communication between
the sound unit and the internet takes place via the digital computing unit, leading to a cheaper loudspeaker box. The digital computing unit may be formed by a smart phone or a portable computer such as a laptop computer. The proliferation of these devices is high, so that most potential users of the loudspeaker box will likely have the possession of such a device. Again the communication circuit is adapted for connection with the internet through a wifi network, a wired network or directly to a wireless internet network, such as a 3G or 4G network.

For enjoyment of the sound, such as music for single users at a location, it is preferred that the sound unit comprises a headphone set and a separate digital computing unit connected to the headphone set, the headphone set comprising the loudspeaker, and the digital computing unit comprises the processor, the communication circuit and the amplifier.

Although wired connections are not excluded, it is preferred that the loudspeaker box is connected to the digital computing unit through a wireless connection. This may also be the case for the headphone set, although cords are common for connections between the headphone set and the digital computing unit such as a smartphone or laptop computer.

An aim of the invention is to allow people in different locations to enjoy the same sound such as music simultaneously and to share their views and feelings about the sound. To allow oral communication between users of the sound units listening to the same sound, it is preferred that the sound unit comprises a microphone connected to the processor.

According to another aspect of the invention, the sound unit is adapted to communicate with other sound units, listening to the same sound.

A further embodiment provides the feature that the sound unit comprises a receptacle for a sim card, wherein the contacts of the sim card receptacle are connected with the processor. This allows accounting via sim cards, either pre-paid or subscribed sim cards. It is noted that generally speaking mobile phones have receptacles for sim cards, which are used for sim cards for the connection with the internet and the telephone network, so that this receptacle is not available for additional sim cards as required by this
embodiment. Hence the receptacle must be formed by a receptacle in the loudspeaker box itself or a dedicated extra receptacle in the digital processing unit.

Preferably this embodiment is combined with a digital system to be described further in this document, wherein the server is adapted to make connections only with sound units of which a sim card present in a receptacle of the sound unit, is recognized.

The invention also relates to a loudspeaker box as a part of the sound unit as described above, wherein the loudspeaker box comprises the processor, the amplifier and the at least one loudspeaker. This embodiment requires a connection to the internet via a digital computing unit. Direct connection to the internet is also possible, but it would require a communication circuit.

Enjoyment of sound is enhanced when it is combined with visual experiences. Hence a preferred embodiment provides the feature that the loudspeaker box comprises optical display elements such as an array of lights or a display unit and that the processing unit is adapted to derive a video signal from the received, decoded signal and to control the optical display elements. When the audio signal comprises music, the display elements may display patterns relating to the music and varying simultaneously with the music. However the display elements may be adapted to represent video content, offering the possibility to enjoy video's simultaneously with the music. Of course the sound may also be formed by sound accompanying the video content. The video content may be reproduced by the optical display elements.

As stated before, it is preferable that a digital computer is provided between the loudspeaker box and the internet. This digital computer is not only used to allow a more simple connection to the internet, but also to control the loudspeaker box. However it is not excluded that the loudspeaker box is directly connected to the internet and the communication circuit is adapted thereto. In such situations the user would have to control the loudspeaker box directly. For such situations an embodiment the loudspeaker box comprises actuating means, connected to the processor means and adapted to generate response signals wherein the communication circuit is adapted to send response signals to the server.
The main aim of the invention is to allow people in different locations to enjoy the same sound such as music simultaneously. However in some situations it may be desirable to have more loudspeaker boxes according to the invention available in one location or room. Hence a preferred embodiment provides a loudspeaker box, comprising detection means adapted to detect similar loudspeaker boxes located in the vicinity of the loudspeaker box according to the invention. The detected loudspeaker boxes may then be connected to the same server a reproduce the same sound simultaneously to provide a higher volume, for instance in large rooms or to enhance the quality of the reproduced sound. Herein the detected loudspeaker boxes may be connected to the internet directly or through a computer, which may be the same computer which connects another loudspeaker to the internet.

Apart from the connection possibilities mentioned above, it is also possible that the communication circuit is adapted to exchange signals with communication circuits of similar loudspeaker boxes in the vicinity via a wireless connection. These communication signals may be formed by sound signals coming from the microphones in the sound units, or by written communication form key boards or touch screens. Preferably the communication between sound units reproducing the same sound when formed by sound signals takes place via the VoIP-protocol. This protocol does not use system clock signals. In case of a connection with a limited band width, the quality of the VoIP signal may be 'gracefully degraded'.

According to a preferred embodiment the loudspeaker boxes can be stacked and further be arranged adjacently in their horizontal direction to form a substantial rectangular array of loudspeakers. Hence a preferred loudspeaker box comprises mechanical coupling means for mechanical coupling with adjacent similar loudspeaker boxes.

When the loudspeaker boxes in the array are provided with displays or other visual units on their front sides, the combined arrays may be used as a larger visual unit. To allow this, the control unit according to a preferred embodiment is adapted to control the optical display elements as a part of a larger optical display element, distributed over a number of adjacent loudspeaker boxes. This larger optical display element allows to display images with larger resolutions and hence with more detail.
The embodiments discussed hitherto all relate to the loudspeaker box itself or to the combination of loudspeaker box or a headphone set and a digital computing unit. If the loudspeaker box is not adapted for direct connection to the internet, a digital computing unit is required. Hence the present invention also provides a digital computing unit, adapted for communication with the internet, wherein the computing unit is programmed to communicate with a loudspeaker box according to any of the preceding claims, apart from claim 2.

As discussed before, it is attractive if the digital computing unit is a smart phone or a portable computer.

According to a preferred embodiment the digital computing unit is programmed to allow the computing unit to control the control unit in the loudspeaker box.

To set up the a sound session, the digital computing unit is programmed to initiate communication with the server after receiving an attention call from the server and to allow communication with the server afterwards. This situations applicable when a user of another loudspeaker box has requested to start a common session for listening to sound by sending a request to the server, which redirects it to the loudspeaker box concerned. It can however not be excluded that a direct call is directed from a computer unit connected to the initiating loudspeaker box to the computer unit connected to the second computer unit, under circumventing the server. However the server must be contacted one way or another to start the narrowcast of sound.

In situations wherein multiple loudspeaker boxes are combined, it is possible to connect most loudspeaker boxes to a single loudspeaker boxes, thus creating a master slave structure. It is however also possible to that the digital computing unit is programmed to connect with multiple loudspeaker boxes located in the vicinity of the computing unit.

Another preferred embodiment provides the feature that the digital computing unit comprises actuating means and that it is programmed to generate response signals and send these response signals to the server.
To allow oral communication between users of the sound units listening to the same sound, it is preferred that the sound unit comprises a microphone connected to the processor.

The present invention also relates to a digital program adapted to be installed in a digital computing unit as discussed above and to perform the function as discussed above.

The invention also relates to a digital system for distribution of audio signals through the internet, comprising a server, adapted to be connected to at least two sound sources connected to the internet and to be connected to a sound unit as discussed above, wherein the server is adapted to select a sound source after reception of a response signal from a sound unit.

As discussed earlier, the server is preferably adapted to connect at least two sound units to the same sound source, wherein the server is adapted to synchronise the signals from the sound source to the sound units.

The sound source can be formed by a music streaming service, but it is also possible that the sound source is formed by a recording unit located at a live music event. In the latter case the sound experience is enhanced as this feature allows the user to be 'virtually present' at the live music event. To even further enhance the experience, it is preferred that communication can be established with a person present at the live music event when the sound source comprises an apparatus allowing to communicate with sound units. This feature allows to establish communication between for instance a disk jockey at the live music event and a user of a sound unit, allowing to discuss for instance requests for music.

Preferably the server in the digital system is adapted to mutually connect the at least two sound units to allow mutual communication.

Further the server is preferably adapted to supply related video signals to the loudspeakers to which the sound signal from the same sound source is provided.
To allow accounting of the services offered, it is preferred that the server is adapted to allow connections only with sound units of which the address is entered in a register.

The invention also provides a method of distributing sound through the internet, wherein the same sound from a single sound source is supplied simultaneously and synchronized to at least two different sound units.

Preferably the method also includes the establishment of a communication channel between the sound units to which the sound from a single sound source is supplied.

Another preferred embodiment provides method wherein the sound is supplied together with a video signal, wherein the video signal supplied to different loudspeaker boxes a supplied, is related.

Subsequently the present invention will be elucidated with the help of the accompanying drawings, wherein depict:

Figure 1 : a diagram showing a first embodiment of the system according to the invention;
Figure 2 : a diagram showing a second embodiment of the system according to the invention;
Figures 3A-C : diagrams showing embodiments of the sound units according to the invention;
Figure 4A : a block diagram showing a possible structure of the connection between a digital computing unit and a number of loudspeaker boxes;
Figure 4B : a block diagram showing an alternative structure of the connection between a digital computing unit and a number of loudspeaker boxes;
Figure 5 : a diagrammatic perspective view of a set on stacked loudspeaker boxes; and
Figure 6 : a diagram of a configuration of a number of sound units according to the invention for use outside or in case an in-home wifi or wired network is not available;
Figure 7 : a diagram similar to that of figure 6, but configured for use inside;
Figure 8: a diagram of another configuration of a number of sound units for use inside;

Figure 9: a diagram similar to that of figure 8, for use outside;

Figure 10: a diagram of yet another configuration of a number of sound units for use inside; and

Figure 11: a diagram similar to that of figure 10, for use outside.

Referring to figure 1, the present invention relates to narrowcasting of sound such as music from a server 1 to a number of sound units 2a, 2b, 2c via the internet which is represented by the area 3 enclosed by a dotted line. The server receives the sound from one of the sound sources 4a, 4b. Further the server 1 is connected to a register 5 for accounting purposes. Figure 1 shows that the sound units 2a, 2b and 2c are mutually connected via the internet. As stated before in this document, the aim of the invention is to allow an enhanced experience during the listening to sound such as music, mainly through listening to the same synchronised sound with others, which do not need to be at the same location. Hence the server 1 sends audio signals combined with audio clock signals and/or time stamping signals to the sound units 2a, 2b and 2c, which may be located at different locations. It is however relevant that the sound such as music is reproduced simultaneously at all three locations by the loudspeaker boxes. Therefore the audio signal is combined with system clock and/or time stamping signals supporting the simultaneous reproduction and the sound units are adapted to synchronise the reproduction of the audio signals to the system clock.

Another aspect of the invention is ability of the users, listening to the same sound, to communicate, for instance to discuss the sound. In the depicted embodiment this communication takes place through the internet, and it may take the form of oral communication, which necessitates the presence of microphones in the loudspeaker boxes. The communication may also take the form of characters, which requires the presence of a key board, touch screen and a display at the sound units.

Figure 2 shows a an embodiment deviating from the embodiment depicted in figure 1 by the connection of the server 1 with servers 6a, 6b of social networks such as Facebook, allowing to use these social networks to establish connections with other users.
Figure 3A depicts a diagram of a first embodiment of a sound unit 2. This embodiment of the sound unit 2 incorporates a loudspeaker box 7, indicated with dotted lines. The loudspeaker box 2 comprises an antenna 10, for reception and transmittal of signals directly to and from the internet 3, and a communication circuit 11, connected to the antenna 10. The communication circuit 11 is adapted to code and modulate signals from the processor to be sent, and to demodulate and decode the received signals and to synchronise the reproduction of the audio signals to the system clock signal. When the sound unit is also adapted to display video signals, the communication circuit is also adapted to synchronise the reproduction of the audio signals to the system clock signal.

The loudspeaker box 7 further comprises a processor 12, programmed to perform the required actions, such as the making of connections, etc., an amplifier 13 connected to the processor 12 and a loudspeaker 14. In the embodiment depicted the loudspeaker unit further comprises a display 15 adapted to visually represent pictures sent via or through the server 1. The display unit may be formed by an array of light sources such as LEDs, but it may also be formed by a complete visual display. To allow communication with other listeners to the same sound (buddies), the loudspeaker box comprises a microphone 17 connected to the processor. For clarity auxiliary components such as power supply are omitted from the drawings. The power supply may be formed by a battery or by a power supply circuit connected to a cord and plug to allow it to be connected to the mains, but it may also be connected to a socket provided in the housing of the loudspeaker box, the socket being adapted to be connected to a USB power supply unit.

Fig 3B depicts a second embodiment of a sound unit 2. This sound unit comprises a loudspeaker box 7 and a digital computing unit embodied as a smartphone 16, both indicated by dotted lines. The smartphone comprises an antenna 10, a communication circuit 11, connected to the antenna 10 and a second antenna 20 adapted for communication to the loudspeaker box 7 through a protocol for closer range, such as Bluetooth or wifi. Hence the loudspeaker box 7 comprises an antenna 21, the processor 12, amplifier 13 and loudspeaker 14, just as in the first embodiment. Herein the antenna 21 is adapted for the same protocol as antenna 20 in the smartphone. This embodiment does not disclose a display, but it will be clear that such a display may be added. Further in this embodiment the processor 12 is present in the loudspeaker box 7.
It is possible to distribute the functions to be performed by the processor 12 to the processor already present in the smartphone. This would lower the burden on the processor 12 in the loudspeaker box, allowing to use a cheaper processor. Of course the digital computing unit may be formed by a tablet computer or laptop computer rather than by a smartphone. Although not depicted in the drawings the microphone of the smartphone may be used for communication between listeners to the same sound. In many cases the processors present in said computers are not suitable for the quick demodulation and synchronisation of the digital audio and possibly video signals so that a dedicated circuit will have to be provided, in which the processing is implied in hardware.

Although not depicted in the drawings, in the embodiment of figure 3B, a receptacle such as a slot for a sim card can be incorporated into the loudspeaker box 7, allowing to check the identity of the user and whether the user is allowed to access the system according to the invention.

The embodiment depicted in figure 3C comprises a headphone set 23 and a digital computing unit embodied as a smartphone 16, both indicated by dotted lines. The smartphone 16 comprises an antenna 10, a communication circuit 11, connected to the antenna 10, a processor 12, an amplifier 13, a socket 24 and a display unit 15. All these components will be formed by components already present in the smartphone. The headphone set 23 comprises, apart from the loudspeakers and related parts to fix these to the head of a listener, a cord 25 with a plug 26, which can be connected to the socket 24. Hence the headphone set 23 does not deviate from generally available headphones.

All the functionality of the invention in this embodiment is present in the software used to program the digital computing unit. Although not depicted in the drawings the microphone of the smartphone may be used for communication between listeners to the same sound. Of course the microphone present in most commercially available headsets can be used for this purpose as well.

In the embodiments described above, the sound units all comprise a single loudspeaker box or headphone set connected to the internet. These are the most feasible situations when a single loudspeaker box is used in a single location. In many cases more than one loudspeaker box is used in a single location, often in a single room. Then this multitude
of loudspeaker boxes to the internet via a single computing unit. Such a combination of a single digital computing unit and a number of loudspeaker boxes or headphone sets is to be regarded as a single sound unit. A first embodiment, as depicted in figure 4A, provides a dedicated connection for each of the loudspeaker boxes 2a, 2b and 2c in the room to a single computing unit 7. To avoid overloading the connection circuit of the computing unit 7, it is attractive to adapt the loudspeaker boxes 2 for mutual communication, thus allowing a multitude of loudspeaker boxes to be connected to the internet through a single computing apparatus. Such a situation is depicted in figure 4B. In this embodiment the communication between the loudspeaker boxes is organised in a star shaped pattern, but as an alternative it can be organised in an annular pattern.

Finally figure 5 depicts an array of loudspeaker units 2. In the embodiment depicted in this figure, the loudspeaker boxes have a cubical shape, but other shapes, such as with rectangular shapes are possible. The combination of loudspeaker boxes thus formed combines the sound of all loudspeakers located in the loudspeaker boxes, as the synchronising feature discussed earlier makes the sound emerging from the loudspeakers simultaneous. Further the display units, which in the depicted embodiment are formed by arrays of LEDs, are controlled synchronously to obtain a unified image. The image is preferably related to the music emerging from the loudspeakers. Hence it may comprise a video signal, requiring a video display, but in the present embodiment variations of colour and intensity, together with varying patterns may be synchronised with the sound form the loudspeakers.

Figure 6 displays a configuration of sound units 2, of which one sound unit serves as the master sound unit 2a and the others as slave units. As this configuration is adapted to be used outside or were a wifi or wired network is not available, the connection of the server is via a smartphone 30, which is adapted to pick up wireless signals from the internet and hence from the server. Further the smart phone 30 is adapted to generate control signals for controlling the volume, source and other variables for each of the sound units. This figure also shows that the control is conducted via the master sound unit 2a.

The configuration depicted in figure 7 shows a similar configuration, but with a wired connection to the internet via a router 31. The content signal and clock signals are
guided through the router 31, bypassing the smartphone 30, which is connected with the router for control only.

The configuration shown in figure 8 displays a simple configuration without master sound unit, but only two sound units 2, which are each connected to the internet via the router 31. Again control takes place by the smartphone 30, which is connected to the router 31 only for control. Further this figure shows that the signal sent to the sound units 2 comprises the synchronisation component, formed by the clock signals.

Figure 9 shows the configuration of figure 8, but adapted for use outside by use of the smartphone, rather than the router as connection with the internet.

The configuration of figure 10 displays a configuration in which smart phones form a part of the sound unit, and wherein the smart phones 30 are both connected to a loud speaker 32 to comprise all the components of the sound unit. In this figure, which is adapted to be used inside, the internet signal is guided via a router 31, and then to one of the smart phones, functioning as the master smartphone 30a and from there to the second or further smart phones 30 working as slaves. The resulting sound signal, which is converted from the digital sound signal to an analogue sound signal is supplied to the loud speakers 32 to which the relevant smartphone is connected.

Finally figure 11 shows the outside' equivalent of figure 10, wherein the master smartphone forms the connection with the internet.

It will be clear that in the figures 6-11 the number of sound units 2 or smart phones 30 with loud speakers 32 is not limited to the shown number, but that the number may be higher. Further the invention is not limited to audio or sound, but may also relate to video, despite the fact that figures 6-11 show audio only. A skilled man may derive the video equivalent with the help of the information in this description above.

It will be clear that the embodiments described contain numerous features and these features discussed in diverse embodiments can be mutually combined.
Claims

1. Sound unit, adapted for communication with the internet, comprising a processor, a communication circuit adapted for communication with the internet and connected with the processor, an amplifier connected with the processor and at least one loudspeaker connected with the amplifier, characterized in that the communication circuit and the processor are adapted for reception and decoding audio signals from a predetermined server only, for supplying the decoded audio signals to the amplifier to reproduce the audio signals through the amplifier and the loudspeaker and for reception of audio clock signals and system clock signals from the server.

2. Sound unit as claimed in claim 1, characterized in that the processor comprises dedicated hardware to synchronise the audio signal to the audio clock signal and/or to the system clock signal.

3. Sound unit as claimed in claim 1 or 2, characterized in that the sound unit is formed by a loudspeaker box, comprising the processor, the communication circuit, the amplifier and the at least one loudspeaker.

4. Sound unit as claimed in claim 1 or 2, characterized by a loudspeaker box and a separate digital computing unit connected to the loudspeaker box, the loudspeaker box comprising the processor, the amplifier and the at least one loudspeaker, and the digital computing unit comprising the communication circuit.

5. Sound unit as claimed in claim 1 or 2, characterized by a headphone set and a separate digital computing unit connected to the headphone set, the sound unit comprising the loudspeaker, and the digital computing unit comprises the processor, the communication circuit and the amplifier.

6. Sound unit as claimed in any of the preceding claims, characterized by optical display elements such as an array of lights or a display unit and that the processor is adapted to derive a video signal from the received signal and to control the optical display elements.
7. Sound unit as claimed in claim 4, 5 or 6, characterized in that the loudspeaker box or the headphone set are connected to the digital computing unit through a wireless connection.

8. Sound unit as claimed in any of the claims 1-7, characterized in that the sound unit is adapted to be controlled by a smart device such as a smart phone, provided with an app, adapted to control at least the volume.

9. Sound unit as claimed in any of the claims 1-8, characterized by a microphone connected to the processor.

10. Sound unit as claimed in any of the claims 1-9, characterized in that the sound unit is adapted to communicate with other sound units, reproducing the same sound and that the communication takes place via the VoIP-protocol.

11. Sound unit as claimed in one of the preceding claims, characterized in that the sound unit comprises a receptacle for a sim card, the contacts of the sim card receptacle being connected with the processor.

12. Loudspeaker box as a part of the sound unit as claimed in claim 3 or 4, characterized in that the loudspeaker box comprises the processor, the amplifier and the at least one loudspeaker.

13. Loudspeaker box as claimed in claim 12, characterized by optical display elements such as an array of lights or a display unit and that the processor is adapted to derive a video signal from the received signal and to control the optical display elements.

14. Loudspeaker box as claimed in claim 12 or 13, characterized by actuating means, connected to the processor and adapted to generate response signals wherein the communication circuit is adapted to send response signals to the server.
15. Loudspeaker box as claimed in claim 12, 13 or 14, characterized by detection means adapted to detect similar loudspeaker boxes located in the vicinity of the loudspeaker box according to the invention.

16. Loudspeaker box as claimed in claim 15, characterized in that the loudspeaker box is adapted to exchange signals with similar loudspeaker boxes in the vicinity via a wireless connection.

17. Loudspeaker box as claimed in any of the claims 11-16, characterized in that the loudspeaker box comprises mechanical coupling means for mechanical coupling with similar loudspeaker boxes.

18. Loudspeaker box as claimed in claim 15, 16 or 17, characterized in that the processor is adapted to control the optical display elements as a part of a greater optical display element, distributed over a number of adjacent loudspeaker boxes.

19. Digital computing unit, adapted for communication with the internet, characterized in that the digital computing unit is adapted to communicate with a loudspeaker box according to any of the claims 9-18 or with a headphone set as part of claim 5.

20. Digital computing unit as claimed in claim 19, characterized by a processor comprising dedicated hardware to synchronise the audio signal to the audio clock signal and/or to the system clock signal.

21. Digital computing unit as claimed in claim 19 or 20, characterized in that the digital computing unit is a smart phone or a portable computer.

22. Digital computing unit as claimed in claim 19, 20 or 21, characterized in that the digital computing unit is programmed to allow the computing unit to control the processor in the loudspeaker box.

23. Digital computing unit as claimed in claim 19, 20, 21 or 22, characterized in that the digital computing unit is programmed to initiate communication with the server.
after receiving an attention call from the server and to allow communication with the server afterwards.

24. Digital computing unit as claimed in any of the claims 19-23, **characterized in that** the digital computing unit is programmed to connect with multiple loudspeaker boxes located in the vicinity of the computing unit.

25. Digital computing unit as claimed in any of the claims 19-24, **characterized in that** the digital computing unit comprises actuating means and that it is programmed to generate response signals and send these response signals to the server or to other sound units.

26. Digital computing unit as claimed in any of the claims 19-25, **characterized in that** the digital computing unit comprises a microphone and that it is programmed to send the audio signals coming from the microphone to the server or to other sound units.

27. Digital program adapted to be installed in a digital computing unit as claimed in any of the claims 19, 21-26 and to perform the function as claimed in any of the claims 19, 21-26.

28. Digital system for distribution of sound signals through the internet, comprising a server, adapted to be connected to at least two sound sources connected to the internet and to be connected to at least one sound unit as claimed in any of the claims 1-11, **characterized in that** the server is adapted select a sound source after reception of a response signal from a sound unit.

29. Digital system as claimed in claim 28, **characterized in that** the server is adapted to connect at least two sound units to the same sound source, wherein the server is adapted to send audio clock signals and system clock signals together with the audio signals.

30. Digital system as claimed in claim 28 or 29, **characterized in that** the sound source is a recording unit located at a live music event.
31. Digital system as claimed in claim 28, 29 or 30, **characterized in that** the server is adapted to mutually connect the at least two sound units to allow mutual communication.

32. Digital system as claimed in any of the claims 28-31, **characterized in that** the server is adapted to supply related video signals to the loudspeakers to which the audio signal from the same sound source is provided.

33. Digital system as claimed in any of the claims 28-32, **characterized in that** the server is adapted to make connections only with sound units of which the address is entered in a register.

34. Digital system as claimed in any of the claims 28-33, **characterized in that** the server is adapted to make connections only with sound units of which a sim card present in a receptacle of the sound unit, is recognized.

35. Method of distributing sound through the internet, **characterized in that** the same audio signals from a single sound source are supplied simultaneously to at least two different sound units, wherein each of the audio signals is accompanied by an audio clock signals and a system clock signal.

36. Method as claimed in claim 35, **characterized by** establishing a communication channel between sound units to which the sound from a single sound source is supplied.

37. Method as claimed in claim 35 or 36, **characterized in that** the audio signal is supplied together with a video signal, wherein the video signal supplied to different loudspeaker boxes a supplied, is related.
Content and control signal for use outside

3G/4G/5G TEL NETWORK

SMART PHONE

BUDDY BOX "MASTER"

BUDDY BOX "SLAVE"

BUDDY BOX "SLAVE"

BUDDY BOX "SLAVE"

CONTENT SERVER

e.g. "Spotify"

--- WiFi wired / USB / Bluetooth

--- = Content signal

+++ = Control signal & Selection of content

WIFI

Fig. 6
A. CLASSIFICATION OF SUBJECT MATTER
INV. H04L29/08 H04N21/43
ADD.
According to International Patent Classification (IPC) and both national classification and IPC

B. FIELDS SEARCHED
Minimum documentation searched (classification system followed by classification symbols)
H04L H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
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Further documents are listed in the continuation of Box C.

See patent family annex.

Special categories of cited documents:

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Date of the actual completion of the international search

17 February 2017

Date of mailing of the international search report

24/02/2017

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Hornik, Valentin
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