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(54) **Method for monitoring audio/video connections in a network of distributed stations, as well as a network station**

Verfahren zur Überwachung von Audio/Video-Verbindungen in einem Netzwerk verteilter Stationen sowie Netzwerkstation

Procédé de surveillance de connections audio/vidéo dans un réseau de stations réparties, et station de réseau

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- **RITCHIE J ET AL: "UPnP AV Architecture: 0.83" MICROSOFT CORPORATION, 12 June 2002 (2002-06-12), pages 1-22, XP002271673 cited in the application**

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Description

[0001] The invention relates to the technical field of domestic networks.

Background of the invention

[0002] The efforts to network evermore electronic devices to one another domestically or at home have already now progressed to a very major extent. A range of different standards for the networking of devices have now been worked out, some of which have different objectives. One of the systems envisages devices being networked on the basis of the so-called Internal Protocol IP. A first version of a Standard is already available for this system. This system has become known by the abbreviation UPnP, which stands for Universal Plug and Play. The corresponding standard is currently available, in Version 1.0. Further information related to the UPnP System and the associated Standard can be found on the official Internet site for the UPnP consortium at www.upnp.org. In the UPnP System, there are no restrictions on the device types. It is thus intended to be possible to network not only devices from the consumer electronics field such as TVs, DVD players, set-top boxes, video recorders, camcorders etc., but also domestic devices, such as washing machines, refrigerators, heating controllers, automatic coffee machines, and so on. Personal computers may form a specific category of devices, although these are also taken into account in the UPnP System and can also be integrated in the network.

[0003] However, the various layers of the OSI/ISO reference model for data communication are not specified in the UPnP system. This relates in particular to the bit transmission layer and the data link layer. The UPnP System therefore no longer contains any specification related to the transmission medium via which the data to be interchanged must be transmitted. Widely differing transmission standards are permissible here. These include, for example, the Ethernet Protocol, IEEE 1394 Protocol, wire-free transmission itself in accordance with IEEE 802. 11x, Bluetooth or HIPERLAN/2.

Invention

[0004] In the course of UPnP Standardization, a specification for the transmission of AV data (audio/video-data) between network subscriber stations has also been worked out, and was completed in June 2002. The precise title of this specification is: UPnP AV Architecture: 0.83 dated June 12, 2002. This specification defines three different types of devices for the transmission of AV data. Firstly a so-called media server, which is always allocated to that device which is chosen as the source of the AV data. The second device type is the media renderer, which is allocated to a device which is chosen as a data sink for the AV data. Thirdly, a control point type is also provided, as a dedicated type of device. A universal remote control for AV devices is generally considered to be an example of a control point device. However, alternatively, a personal computer in the network can also carry out this task, or else a TV with a remote control may likewise be suitable as a control point. The control point device communicates with two further UPnP devices, which may be used as a data source and data sink for a desired AV connection. The control point device initializes and configures both devices for the AV connection, so that the desired data stream can also be sent. Once an AV connection such as this has been set up, the control point device does not need to control the rest of the data transmission, and the UpnP AV specification does not contain any stipulations that the control point must be active all the time throughout the duration of the AV connection that has been set up. Instead of this, the control point device may also be disconnected from the network. The task of a control point device is thus typically to set up an AV connection between two network subscribers, to make any changes required to the settings of the two devices (typically including the volume setting, the brightness setting, the contrast setting, the tone setting, the sharpness setting and so on) and, once the desired AV data stream has been transmitted, to cap the connection once again, that is to say request both devices associated with the AV connection to delete the data that characterizes that connection.

[0005] If, however, as has already been mentioned above, the control point device is disconnected from the network once the AV connection has been set up, irrespective of whether this is a result of disconnection by the user or a result of a malfunction, then it is possible for the situation to occur in which the two devices in the AV connection still remain connected to one another even after the AV data stream has been transmitted, and in the worst case even for as long as the devices remain switched on. This behavior conceals the risk that, if the control point device once again wishes to set up an AV connection for one of the previously connected devices at a later point in time, this new connection cannot be set up because one of the previously connected devices is still maintaining the old AV connection. The control point device could admittedly deal with this fault situation if it were previously to gather all the data about the connections that have been set up by all the network subscriber stations, but this would involve a high degree of complexity in terms of additional messages, which would be incurred whenever the control point device had previously been switched to be inactive.

[0006] The invention solves the problem in that a portion of the control point device functionality is implemented in media server and media renderer devices for an AV connection.

[0007] The invention provides in a first aspect a method as defined by independent claim 1.

[0008] However, a situation is possible in which a station is no longer able to send the logging-off message. For example, if the network plug for this station is pulled

out, it is no longer possible to transmit this logging-off message. In this situation, it is advantageous for provision to be made for a station to monitor an AV connection to determine whether the logical connection has remained unused for a first specific time and if yes, to send a signaling request to the station in the network and, finally, to monitor all the signals from the network stations and, in the absence of signaling from the station to which it is logically connected, to automatically internally end the setting up of the logical connection. In consequence, a connection is thus correctly cleared even when a station which is logged off from the network is no longer able to send the logging-off message. This corresponds to the subject matter of dependent method claim 2.

[0009] This measure can advantageously also be carried out in particular whenever a new connection request arrives at the station. This corresponds to the subject matter of dependent method claim 3.

[0010] It is also advantageous if it is found after a signaling request that the other station in the logical connection that has been set up is still in the network but that the logical connection has remained unused for a second specific time, for the station which is carrying out the check to internally finally end the setting up of the existing logical connection, which has been inactive beyond the specific time limit (which may be several hours). This corresponds to the subject matter of dependent method claim 4.

[0011] Corresponding advantageous measures for a network station are listed in claims 7-11.

Drawings

[0012] Exemplary embodiments of the invention will be explained in more detail in the following description and are illustrated in the drawings, in which:

Fig. 1 shows an outline diagram of the transmission of AV data between two network stations using the UpnP AV Architecture: 0.83;

Fig. 2 shows the procedure for an AV data transmission between a set-top box and a video recorder;

Fig. 3 shows an example of the network shown in Fig. 2 with an AV connection having been set up;

Fig. 4 shows the transmission of a logging-off message after a station in the connection that has been set up is switched off;

Fig. 5 shows the procedure for connecting a device between a set-top box and a TV;

Fig. 6 shows the AV connection which is set up between a set-top box and a TV;

Fig. 7 shows the remaining existence of a connection which has been set up, after a station in the AV connection has been switched off;

Fig. 8 shows the problem of setting up an AV connection between a set-top box and a stereo amplifier when a connection is still in existence between the set-top box and the video recorder;

Fig. 9 shows the procedure for setting up an AV connection between a set-top box and a stereo amplifier;

Fig. 10 shows the AV connection which is set up between a set-top box and a stereo amplifier;

Fig. 11 shows a first example for a program for monitoring an AV connection and

Fig. 12 shows a second example for a program for monitoring an AV connection.

Exemplary embodiments of the invention

[0013] AV connections between two devices in a domestic network are set up in accordance with the AV specification for the UPnP Standard cited above. The UPnP AV specification in this case distinguishes between three different station types. Firstly a so-called media server. That station in an AV connection which is intended to be used as the data source is associated with the media server device type in accordance with the UPnP AV specification. The second type of device is a media renderer. This type is assigned to the device which has been chosen as the data sink for the AV connection. Another type of device is the control point. This device type is normally assigned to the device type on which the control values are displayed. This is thus normally a device which is equipped with a display. The TV in a domestic network is mentioned as one example. Other examples are a personal computer which is integrated in the domestic network, or a universal remote control with a display, which is likewise integrated in the domestic network by means of wire-free transmission. Figure 1 shows the fundamental subdivision of network stations which are required for an AV connection. The media server device includes or has access to an AV data stream which, for example, in stored locally or is received externally. The media server device has access to the AV data and is able to transmit an associated AV data stream via the network to another network station. The AV data stream is in this case transmitted using a transfer protocol appropriate for the transmission medium used in the network. The associated data format is defined in the transfer protocol, and the media server must have this transfer protocol implemented in it. In Figure 3, the transport protocol is referred to in a general form as an AV protocol. The media server

device type can typically be allocated to one of the following devices. VCR, CD/DVD player, camera, camcorder, PC, set-top box, satellite receiver, audiotape-player etc. A module for a so-called content directory is normally implemented in the media server in accordance with the UPnP Standard for selection of a specific AV content. In addition, there is also another module, which is referred to as a connection manager. This module is required for communication with the control point device.

[0014] A media renderer device receives the AV data stream that is transmitted from the media server and emits this either as picture information or as audio information. The media renderer device thus likewise contains an implementation of the AV transport protocol. In the same way, the media renderer device likewise contains an implementation of the connection manager module for communication with the control point device. Furthermore, a rendering control module is implemented in the media renderer device. This module is used, for example, to implement the command received via the connection manager to adjust replay characteristics, such as the volume, tone, picture sharpness, contrast, brightness, color and so on. A TV, a stereo amplifier and an MP3 player may be mentioned as example of devices to which the media renderer device type should be assigned in the domestic network.

[0015] A control point device coordinates the data transport between the media server and the media renderer. It is likewise used to implement the control commands from the operator and to pass them to the corresponding appliances in the AV connection. This relates in particular, as an example, to the play, stop, pause, fast forward and fast reverse commands. As mentioned, the control point device is likewise used to produce the user interface for the operator. The control point device is active in particular when setting up the logical connection between two network stations. It is likewise also used when the aim is to end the setting up of the AV connection after an AV connection has served its purpose, that is to say that the AV data stream has been transmitted as selected. However, UPnP AV specification does not stipulate as an essential feature that the control point device must remain active throughout the entire duration of the AV connection. The problems that are associated with this have already been explained in the introductory part of the application.

[0016] As is shown in Figure 1, the transmission of the AV data in accordance with the implemented AV transport protocol is independent of a communication with the control point device. The data stream is thus transmitted even when the control point device has logged off the network after setting up the AV connection. Since the known transport protocols are standardized, no further information relating to them will be given in the following text. In contrast, a more detailed explanation will be given of the additional means which must be provided for the connection manager in order to implement the invention.

[0017] Figure 2 shows a simple domestic network. The reference number 10 denotes a set-top box for receiving digital television and radio programs. The reference number 20 denotes a video recorder. The reference number 30 denotes a TV. A remote control 31 is also illustrated separately. Nowadays, so-called universal remote controls are typically supplied, with which further devices can then also be controlled. It is therefore assumed here that the same remote control can also be used for remote control of the set-top box and video recorder 20. The reference number 15 denotes the bus connection for networking of the devices. A bus connection based on the Ethernet Bus Standard is mentioned here by way of example. However, the invention is applicable irrespective of what bus connection is actually used. Other bus connection standards include, for example, IEEE 1394, IBM Token Ring, Powerline, and wirefree transmission standards such as IEEE 802.11b and HIPERLAN/2.

[0018] In the situation illustrated in Figure 2, the operator has used a remote control 31 to set up an AV connection between the set-top box 10 and the video recorder 20. The TV 30 then acts as the control point device to send the prepare-for connection instruction (STB, VCR) as specified in the UPnP Standard. This instruction is used to address the connection manager module for the set-top box 10 and for the VCR 20. The instruction is unambiguous with respect to the question as to which device should be used as media server device and which as the media renderer device. In this case, the set-top box 10 should be used as the media server, and the video recorder 20 as the media renderer.

[0019] Figure 3 shows an example of the network after setting up the AV connection between the set-top box 10 and the video recorder 20. In this case, the TV 30 is now shown only by dashed lines. This is intended to indicate that the TV has logged off the network after the connection has been set up. For example, the AV connection can be set up on the basis of the video recorder 20 having been previously programmed to record a specific TV program. Once the connection has been set up and the video recorder has been programmed, the user then switches off the TV because it is not in fact required to record the selected program. The AV connection that was set up is represented by dashed lines in Figure 3.

[0020] Figure 4 shows the network example at the time after which the video recorder has recorded the programmed TV program. The video recorder 20 normally switches itself off after recording the programmed time. This time is illustrated in Figure 4. Since this is a normal switching-off process, the video recorder 20 would in this case also generate a logging-off message ssdp:byebye provided in the UPnP Standard, and will send this using the so-called multicast addressing mode to all the network stations. At the time that the logging-off message is sent, the TV 30 is, however, inactive (in the standby mode or power-off mode). It therefore cannot evaluate the logging-off message from the video recorder 20 when it is in the power-off mode, nor, depending on the design,

can it evaluate it when in the standby mode. Instead of this, the set-top box 10 evaluates the logging-off message from the video recorder 20. This is a special feature of the invention since the UPnP Standard does not provide for a media server device or a media renderer device other than the control point device to have to evaluate this logging-off message. If the set-top box 10 has identified the logging-off message, it will also, according to the invention, end the setting up of the AV connection between the set-top box 10 and the video recorder 20. In the simplest case, this can be done by carrying out the connection complete (STB, VCR) action provided in the connection manager in accordance with the UPnP Standard. This action is supported in the connection manager module of both the media server device and of the media renderer device.

[0021] Figure 5 now shows the network after clearing the AV connection between the set-top box and the video recorder 20. The video recorder 20 is shown by dashed lines in Figure 5 in order to indicate that this device has logged off the network. At the same time, the TV 30 has been activated again, and the operator has requested that an AV connection be set up between the set-top box 10 and the TV 30, using the remote control 31. The TV 30 then sends the associated prepare-for connection (STB, TV) instruction. The set-top box 10 and the TV 30 will carry out this instruction, since the set-top box 10 had evaluated the logging-off message ssdp:byebye as already shown in Figure 4, and had once again deleted the AV connection that had previously been set up.

[0022] Figure 6 shows the network after setting up the AV connection between the set-top-box 10 and the TV 30. There are problems in setting up a new AV connection when the old existing AV connection for a network subscriber station which is also selected for the new AV connection is still entered in the memory. This is because the station which was requested to set up a further AV connection will then have to reject this request, since there are normally only sufficient resources for one AV connection. This situation is illustrated in Figure 7. In this case, the video recorder 20 has disconnected itself from the network without sending the logging-off message ssdp:byebye. The AV connection that is set up is thus still entered in the memory for the set-top box 10. If the prepare-for connection(STB, TV) instruction is now sent by the TV 30, the set-top box 10 must reject this request since, in fact, an AV connection already exists. In order to circumvent this undesirable situation in a domestic network, the invention also provides further features, which will be explained in the following text.

[0023] To this end, Figure 8 shows a further example of a domestic network. In this situation, a stereo amplifier 40 is provided in addition to the set-top box 10, video recorder 20 and TV 30 stations. This stereo amplifier 40 is a digital amplifier which can receive digital audio signals as input signals, can convert them to analogue data, and can output them in amplified form to the loudspeaker. Figure 8 shows the situation where an AV connection had previously be set up between the set-top box 10 and the video recorder 20. The video recorder is once again illustrated by dashed lines as an indication that it has logged off the network. However, the logging-off process was not carried out correctly using the logging-off message. By way of example, the user could have integrated the stereo amplifier in the network for the first time and in the process could have removed the network connector from the video recorder, and could have subsequently forgotten to plug it in again. The situation which then results is illustrated in Figure 8. As before, the AV connection from the set-top box 10 to the video recorder is still entered in the memory.

[0024] Referring to Figure 9, the user has entered the request to set up a connection between the set-top box 10 and the stereo amplifier 40. Once again acting as the control point device, the TV 30 then sends the UPnP instruction prepare-for connection(STB, DAMP). According to the invention, the set-top box 10 will then check whether the existing connection for the video recorder 20 is still valid. The way in which this is done will be explained in more detail later in conjunction with Figures 11 and 12. In the situation illustrated in Figure 9, the AV connection which has been set up is no longer active, and can therefore be deleted. The deletion of the setting up of the connection is initiated by the set-top box 10, specifically by the connection manager and a monitoring service provided in it. The requested new connection between the set-top box 10 and the stereo amplifier 40 is then entered. The process of entering the connection is illustrated in Figure 10.

[0025] Figure 11 shows a structogram for a monitoring program which is additionally located in the connection manager in the set-top box 10. This program is processed continuously while a connection to the set-top box is set up. The reference number 50 denotes the start of the program. The reference number 51 denotes a program step in which a program is carried out to determine whether the logging-off message ssdp:byebye has been received by the connection partner. If the logging-off message has been received, the program then jumps to the program step 56, in which the connectioncomplete(STB) action is called, by means of which the entered connection for the set-top box 10 is once again removed from the memory. If the logging-off message had not yet been received, the program step 52 would first of all check whether the connection that had been set up was currently inactive. This is the situation, for example, when the video recorder 20 is switched to the stop mode when there is a connection between the set-top box 10 and the video recorder 20. For the situation where the connection is still active, the program is ended directly by the program step 56. Otherwise, when an inactive AV connection is present, the timer is checked in the program step 53. This timer is started on each occasion after the fact that an AV connection has become inactive is first identified, and then continues to run until the connection becomes active or until a specific limit value is exceeded. In the illustrated

situation, the limit value is set to 30 minutes. When this count is exceeded, then a signaling request is sent to all the network stations in the next program step 54. The search request message is provided for this purpose in the UPnP Standard. All the nodes that are still active in the network respond to this request with a confirmation message ssdp:alife. The identification number of the responding device is then also in each case entered in this confirmation message. In the UPnP-Standard, this is known by the abbreviation UUID for Universaly Unit Identifier. The program now checks in the next program step 55 whether the ssdp:alife(VCR) message has been received by the connected video recorder. If this is the case, then the program jumps to the program step 56, by means of which the program is ended. The connection is then therefore not ended. Otherwise, it is assumed that the connected device has been disconnected from the network without any logging-off message having been sent. The connection complete(STB) action is then called in the next program step 56, by means of which the connection entered in the memory for the set-top box 10 is deleted. The program is then ended in the program step 57.

[0026] Figure 12 also shows a structogram for a program which is processed in the connection manager of the set-top box when a new connection request is received at the set-top box while an old connection is still set up in the memory. Figure 12 uses the same reference numbers for the same program steps as in Figure 11. To this extent, the program does not need to be explained in any more detail once again. One difference is that, after checking in the program step 52 whether the connection that has been set up has become inactive, the signaling request is sent directly to all the network subscriber stations. Thus, in this case, the count of the timer 1 is not checked first of all. However, if it has been found in the subsequent program step 55 that the connection partner, in the case of the example of video recorder 20, is still registered in the network, the program is not ended straightaway, but a check 58 is then carried out, in which the count of a second timer 2 is checked. The timer 2 is likewise started when it has been found for the first time that the connection which has been set up has become inactive. A check is then carried out at 58 to determine whether the connection that has been set up has been inactive for more than two hours. If this is not the case, the program is ended in the program step 57. However, if this time period has passed, then the connection which has been set up is removed from the memory once again in the program step 56. The newly requested connection can then be set up.

[0027] The invention can be used in a worthwhile manner in particular for devices which are designed in accordance with the UPnP Standard. The invention provides advantages for UpnP-based domestic networks in particular when setting up AV connections which are frequently set up over lengthy time periods. AV connections such as these could, however, also for example be telephone, fax and Internet connections, which likewise also remain in existence over lengthy time periods.

Claims

1. A method for monitoring audio/video connections hereinafter called AV connections which have been set up in a network of distributed stations (10, 20, 30, 40) between a first station acting as a source device and a second station acting as a sink device, which are connected with one another via wire-free or wired bus connections (15), wherein a third station acting as a control device (30) is provided for invoking the setting up and ending of the AV connection by the source and sink devices, **characterized in that** the first or second station (10) of the AV connection monitors to determine whether the station (20) which is AV connected to it has sent a logging-off message and, if yes, **in that** said first or second station (10) autonomously invokes the ending of the AV connection with the station (20) which is logged off.

2. The method as claimed in claim 1, **characterized in that** a station (10) which is AV connected to another station (20) sends a signaling request (54) to the stations in the network in the situation where the AV connection has remained unused for a first specific time, and **in that**, in the situation where the signaling request remains unanswered by the station (20) which is AV connected to the requesting station (10), the requesting station (10) autonomously internally ends the setting up of the AV connection.

3. The method as claimed in claim 1 or 2, **characterized in that**, when a new connection request arrives, a station (10) from which an AV connection to another station (20) has already been set up, sends a signaling request to the stations in the network and **in that**, in the situation where the signaling request remains unanswered by the station (20) which is AV connected to the requesting station (10), the requesting station (10) autonomously internally ends the setting up of the AV connection.

4. The method as claimed in claim 3, **characterized in that**, in the situation in which it is found that the other station (20) on the AV connection which has been set up is still registered in the network, the logical connection has remained unused for a second specific time, the station (10) which is carrying out the check autonomously internally ends the setting up of the existing AV connection.

5. The method as claimed in one of the preceding claims, **characterized in that** audio and/or video data is transmitted via the AV connection.

6. The method as claimed in one of the preceding claims, **characterized in that** the data transmissions in the network are carried out in accordance with the rules of the UPnP Standard.

7. A network station (10) for a network of distributed stations (10, 20, 30, 40) which are networked with one another via wire-free or wire bus connections (15), having means for setting up and ending an audio/video connection hereinafter called AV connection to a second station (20), on receipt of a command for invoking the setting up and ending of the AV connection from a third station acting as a control device (30), **characterized in that** the network station (10) has monitoring means (50-58) which it uses to monitor whether a station (20) which is AV connected to it has sent a logging-off message, and furthermore having means (56) for autonomously invoking the ending of the AV connection which has been set up when the monitoring means (50-58) find that the logging-off message has been sent from the station (20) which is AV connected to it.

8. The network station as claimed in claim 7, **characterized in that** the monitoring means (50-58) are also designed to monitor whether the AV connection which has been set up has remained unused for a first specific time and, if yes, to send a signaling request to the stations in the network, and is also designed such that it autonomously internally ends the setting up of the existing AV connection if the signaling request remains unanswered by the station (20) which is AV connected to the requesting station.

9. The network station (10) as claimed in claim 7, **characterized in that** the monitoring means (50-58) is designed to send a signaling request to the network stations when a new connection request for a further station has arrived and it has been found that the AV connection which has been set up has been unused for that time, with autonomous ending of the setting up of the existing AV connection when the signaling request remains unanswered by the station (20) which is AV connected to the requesting station (10).

10. The network station as claimed in claim 9, **characterized in that** the monitoring means (50 to 58) are also designed such that they end the setting up of the existing AV connection autonomously when it is found that the other station (20) in the AV connection which has been set up is admittedly still registered in the network, but that the AV connection has remained unused for a second specific time.

11. The network station as claimed in one of the preceding claims 7 to 10, **characterized in that** the network station is designed for data transmissions in accordance with the UPnP Standard.

Patentansprüche

1. Verfahren zur Überwachung von Audio/Video-Verbindungen, nachfolgend AV-Verbindungen genannt, die in einem Netzwerk von verteilten Stationen (10, 20, 30, 40) zwischen einer ersten, als Quellengerät wirkenden Station und einer zweiten, als Senkengerät wirkenden Station, die miteinander über drahtlose oder drahtgebundene Busverbindungen vernetzt sind, eingerichtet worden sind, wobei eine dritte, als Steuergerät (30) wirkende Station vorgesehen ist, um das Einrichten und das Beenden der AV-Verbindung durch das Quellen- und das Senken-Gerät aufzurufen, **dadurch gekennzeichnet, dass** die erste oder zweite Station (10) der AV-Verbindung die Bestimmung überwacht, ob die mit ihr AV-verbundene Station (20) eine Abmeldungsbotschaft abgesetzt hat und, wenn ja, dass die erste oder zweite Station (10) selbständig die Beendigung der AV-Verbindung mit der abgemeldeten Station (20) aufruft.

2. Verfahren nach Anspruch 1, **dadurch gekennzeichnet, dass** eine Station (10), die mit einer anderen Station (20) AV-verbunden ist, eine Meldeaufforderung (54) an die Stationen des Netzwerks in dem Fall sendet, bei dem die Verbindung für eine erste bestimmte Zeit ungenutzt geblieben ist, und dass für den Fall, dass die Meldeaufforderung von der mit der auffordernden Station (10) verbundenen Station unbeantwortet bleibt, die auffordernde Station (10) intern die Einrichtung der AV-Verbindung selbständig beendet.

3. Verfahren nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** bei Eingang einer neuen Verbindungsanforderung eine Station (10), von der eine AV-Verbindung zu einer anderen Station (20) bereits eingerichtet ist, eine Meldeaufforderung an die Stationen des Netzwerks sendet, und dass für den Fall, dass die Meldeaufforderung von der Station (20), die mit der anfordernden Station (10) AV-verbunden ist, unbeantwortet bleibt, die anfordernde Station (10) intern die Einrichtung der AB-Verbindung selbständig beendet.

4. Verfahren nach Anspruch 3, **dadurch gekennzeichnet, dass** für den Fall, in dem festgestellt wird, dass die andere Station (20) der eingerichteten AV-Verbindung noch in dem Netzwerk angemeldet ist, aber die AV-Verbindung für eine zweite bestimmte Zeit ungenutzt geblieben ist, die Station (10), die die Überprüfung vornimmt, intern die Einrichtung der bestehenden AV-Verbindung selbständig beendet.

5. Verfahren nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** Audio- und/oder Videodaten über die AV-Verbindung über-

tragen werden.

6. Verfahren nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Datenübertragungen in dem Netzwerk nach den Regeln gemäß den Regeln des UPnP-Standards ausgeführt werden.

7. Netzwerkstation (10) für ein Netzwerk von verteilten Stationen (10, 20, 30, 40), die über drahtlose oder drahtgebundene Busstationen (15) vernetzt sind, mit Mitteln zum Einrichten und Beenden einer Audio/Video-Verbindung, nachfolgend AV-Verbindung genannt, mit einer zweiten Station (20) bei Empfang einer Botschaft zum Aufruf der Einrichtung und Beendigung der AV-Verbindung von einer als Steuergerät wirkenden dritten Station (30), **dadurch gekennzeichnet, dass** die Netzwerkstation (10) Überwachungsmittel (50-58) aufweist, die sie zur Überwachung verwendet, ob eine mit ihr AV-verbundene Station (20) eine Abmeldungsbotschaft abgesetzt hat, und ferner Mittel (56) aufweist, um selbständig das Ende der AV-Verbindung aufzurufen, die eingerichtet wird, wenn die Überwachungsmittel (50-58) feststellen, dass die Abmeldungsbotschaft von der mit ihr AV-verbundene Station (20) abgesetzt wurde.

8. Netzwerkstation nach Anspruch 7, **dadurch gekennzeichnet, dass** die Überwachungsmittel (50-58) weiterhin zur Überwachung ausgelegt sind, ob die eingerichtete AV-Verbindung für eine erste bestimmte Zeit ungenutzt geblieben ist und, wenn ja, eine Meldeanfrage an die Stationen des Netzwerks aussenden, und weiterhin so ausgelegt sind, dass sie intern die Einrichtung der bestehenden AV-Verbindung selbständig beenden, wenn die Meldeanfrage von der Station (20) unbeantwortet bleibt, die mit der anfragenden Station AV-verbunden ist.

9. Netzwerkstation (10) nach Anspruch 7, **dadurch gekennzeichnet, dass** die Überwachungsmittel (50 bis 58) auch so ausgelegt sind, dass sie eine Meldeanfrage an die Netzwerkstationen absetzten, wenn eine neue Verbindungsanfrage für eine weitere Station eingegangen ist und festgestellt wurde, dass die eingerichtete AV-Verbindung zur Zeit unbenutzt ist, mit selbständiger Beendigung der Einrichtung der bestehenden AV-Verbindung, wenn die Meldeanfrage von der mit der anfragenden Station (10) AV-verbundenen Station (20) unbeantwortet bleibt.

10. Netzwerkstation nach Anspruch 9, **dadurch gekennzeichnet, dass** die Überwachungsmittel (50 bis 58) ferner so ausgelegt sind, dass sie die Einrichtung der bestehenden AV-Verbindung selbständig beenden, wenn festgestellt wird, dass die andere Station (20) in der eingerichteten AV-Verbindung zwar noch im Netzwerk angemeldet ist, aber die AV-Verbindung für eine zweite bestimmte Zeit unbenutzt geblieben ist.

11. Netzwerkstation nach einem der vorhergehenden Ansprüche 7 bis 10, **dadurch gekennzeichnet, dass** die Netzwerkstation für Datenübertragungen nach dem UPnP-Standard ausgelegt ist.

Revendications

1. Un procédé de surveillance de connexions audio/vidéo, appelées ci-après connexions AV, qui ont été établies dans un réseau de stations réparties (10, 20, 30, 40) entre une première station agissant en tant que dispositif source et une seconde station agissant en tant que dispositif récepteur, qui sont mises en réseau l'une avec l'autre via des connexions sans fil ou par bus câblé (15), où une troisième station agissant en tant que dispositif de commande (30) est fournie pour déclencher l'établissement et l'arrêt de la connexion AV par les dispositifs source et récepteur, **caractérisé en ce que** la première ou seconde station (10) de la connexion AV effectue une surveillance pour déterminer si la station (20) qui est connectée de manière AV à celle-ci a envoyé un message de déconnexion et, si c'est le cas, **en ce que** ladite première ou seconde station (10) déclenche de manière autonome l'arrêt de la connexion AV avec la station (20) qui est déconnectée.

2. Le procédé selon la revendication 1, **caractérisé en ce qu'**une station (10) connectée de manière AV à une autre station (20) envoie une demande de signalisation (54) aux stations du réseau dans la situation dans laquelle la connexion AV est restée inutilisée pendant une première période spécifique, et **en ce que**, dans la situation où la demande de signalisation reste sans réponse de la part de la station (20) qui est connectée de manière AV à la station demandeuse (10), la station demandeuse (10) termine de manière autonome et interne l'établissement de la connexion AV.

3. Le procédé selon la revendication 1 ou 2, **caractérisé en ce que**, lorsqu'une nouvelle demande de connexion arrive, une station (10) à partir de laquelle une connexion AV à une autre station (20) a déjà été établie, envoie une demande de signalisation aux stations du réseau, et **en ce que**, dans la situation où la demande de signalisation reste sans réponse de la part de la station (20) qui est connectée de manière AV à la station demandeuse (10), la station demandeuse (10) termine de manière autonome et interne l'établissement de la connexion AV.

4. Le procédé selon la revendication 3, **caractérisé en ce que**, dans la situation où il s'avère que l'autre station (20) sur la connexion AV qui a été établie est toujours enregistrée dans le réseau, la connexion logique est restée inutilisée pendant une seconde période spécifique, la station (10) qui effectue la vérification termine de manière autonome et interne l'établissement de la connexion AV existante.

5. Le procédé selon l'une des revendications précédentes, **caractérisé en ce que** des données audio et/ou vidéo sont transmises via la connexion AV.

6. Le procédé selon l'une des revendications précédentes, **caractérisé en ce que** les transmissions de données dans le réseau sont effectuées conformément aux règles de la norme UPnP.

7. Une station de réseau (10) pour un réseau de stations réparties (10, 20, 30, 40) qui sont mises en réseau les unes avec les autres via des connexions sans fil ou par bus câblé (15), comportant des moyens pour établir et arrêter une connexion audio-vidéo appelée ci-après connexion AV à une seconde station (20), sur réception d'une commande pour déclencher l'établissement et l'arrêt de la connexion AV à partir d'une troisième station agissant en tant que dispositif de commande (30), **caractérisé en ce que** la station de réseau (10) comporte des moyens de surveillance (50-58) qu'elle utilise pour surveiller si une station (20) connectée de manière AV à celle-ci a envoyé un message de déconnexion, et comportant en outre des moyens (56) pour déclencher de manière autonome l'arrêt de la connexion AV qui a été établie lorsque les moyens de surveillance (50-58) ont découvert que le message de déconnexion a été envoyé à partir de la station (20) qui est connectée de manière AV à celle-ci.

8. La station de réseau selon la revendication 7, **caractérisée en ce que** les moyens de surveillance (50-58) sont également conçus pour surveiller si la connexion AV qui a été établie est restée inutilisée pendant une première période spécifique et, si c'est le cas, envoyer une demande de signalisation aux stations du réseau, et sont également conçus de telle façon qu'ils terminent de manière autonome et interne l'établissement de la connexion AV existante si la demande de signalisation reste sans réponse de la part de la station (20) qui est connectée de manière AV à la station demandeuse.

9. La station de réseau (10) selon la revendication 7, **caractérisée en ce que** les moyens de surveillance (50-58) sont conçus pour envoyer une demande de signalisation aux stations de réseau lorsqu'une nouvelle demande de connexion pour une autre station arrive et il s'est avéré que la connexion AV qui a été établie a été inutilisée pendant cette période, avec un arrêt autonome de l'établissement de la connexion AV existante lorsque la demande de signalisation reste sans réponse de la part de la station (20) qui est connectée de manière à la station demandeuse.

10. La station de réseau selon la revendication 9, **caractérisée en ce que** les moyens de surveillance (50 à 58) sont également conçus de telle façon qu'ils arrêtent l'établissement de la connexion AV existante de manière autonome lorsqu'il s'avère que l'autre station (20) dans la connexion AV qui a été établie est véritablement toujours enregistrée dans le réseau, mais que la connexion AV est restée inutilisée pendant une seconde période spécifique.

11. La station de réseau selon l'une des revendications précédentes 7 à 10, **caractérisée en ce que** la station réseau est conçue pour des transmissions de données conformément à la norme UPnP.

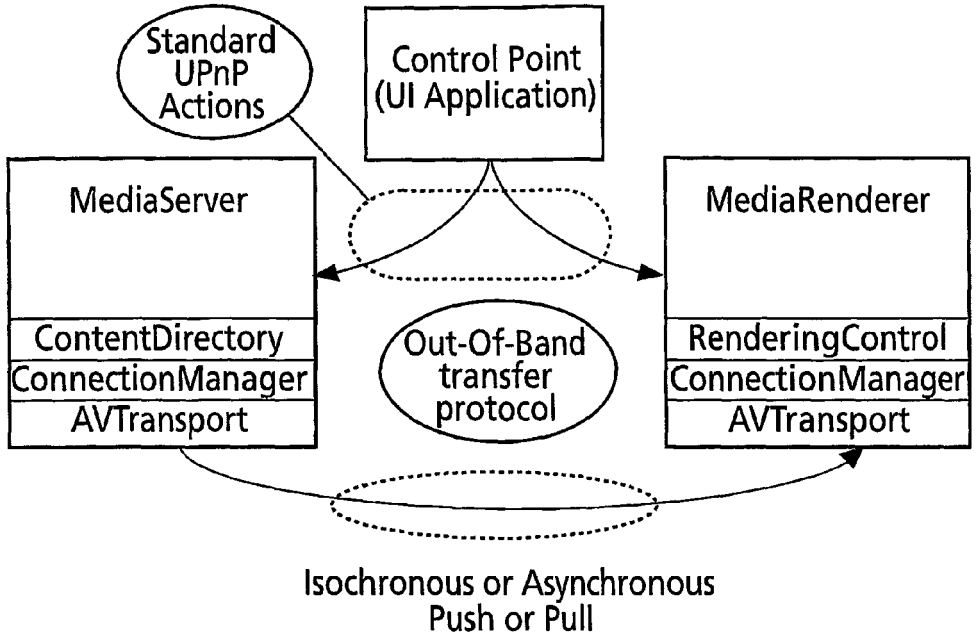
Standard UPnP Actions
Control Point (UI Application)
MediaServer
ContentDirectory
ConnectionManager
AVTransport
Out-Of-Band transfer protocol
MediaRenderer
RenderingControl
ConnectionManager
AVTransport
Isochronous or Asynchronous Push or Pull

Fig.1

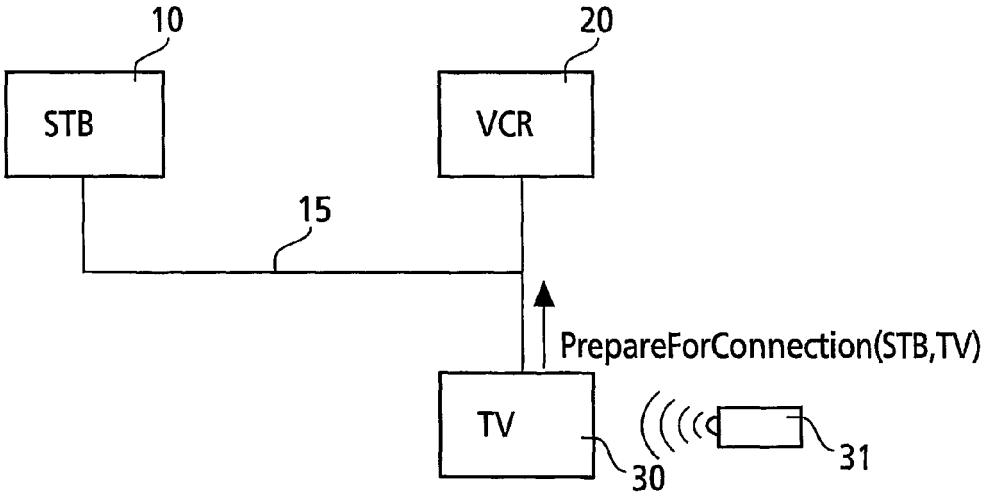
10
20
STB
VCR
15
PrepareForConnection(STB,TV)
TV
30
31

Fig.2

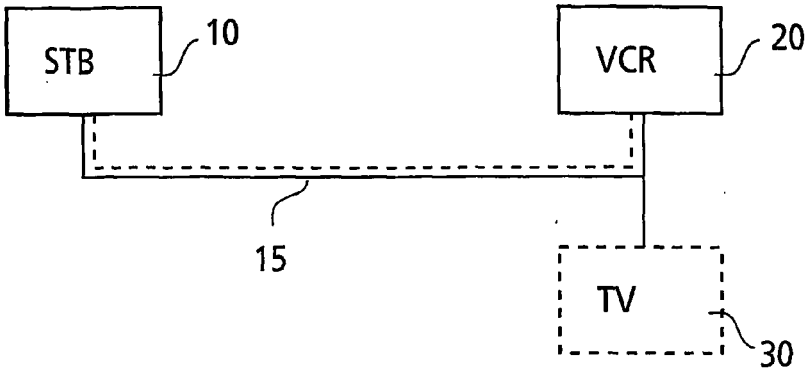

Fig.3

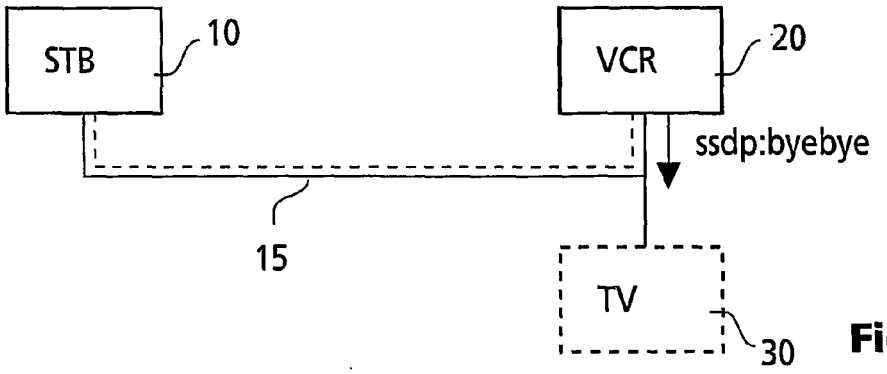

Fig.4

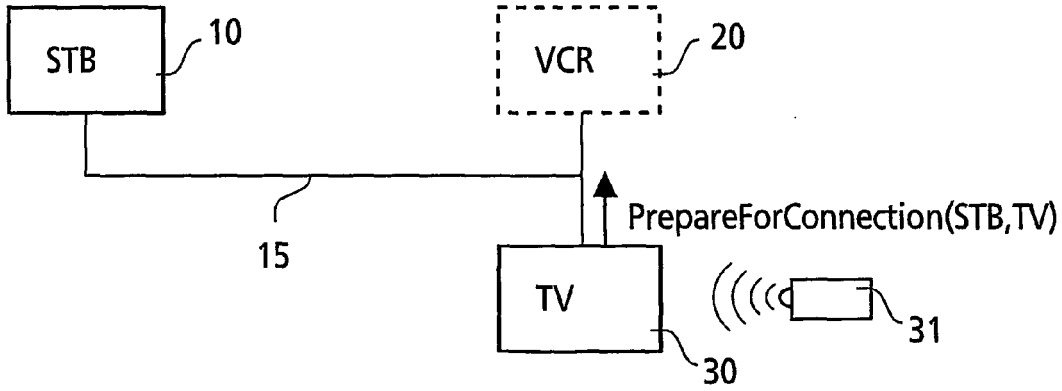

Fig.5

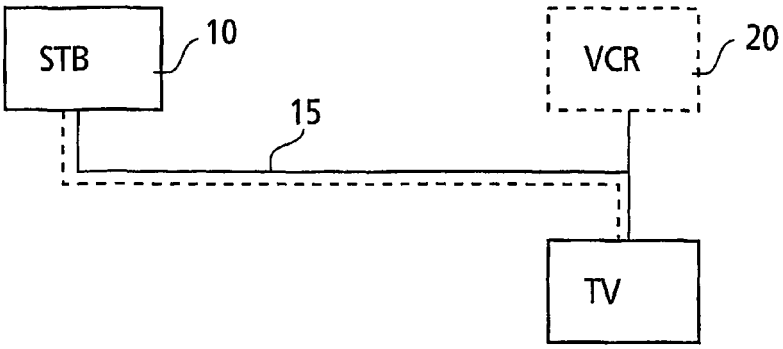

Fig.6

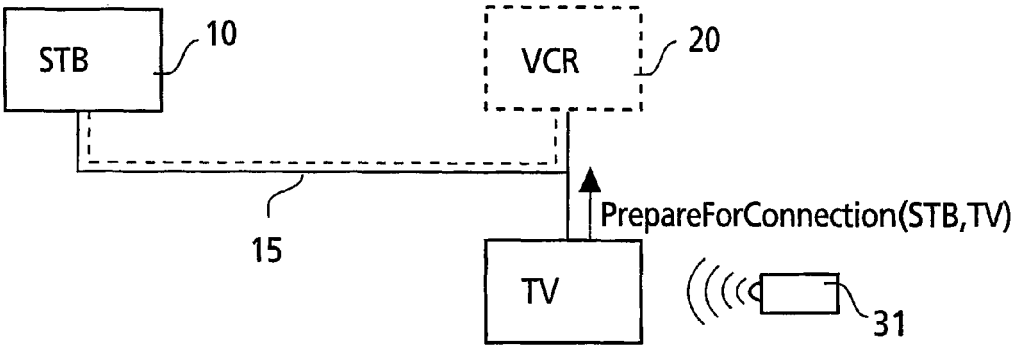

Fig.7

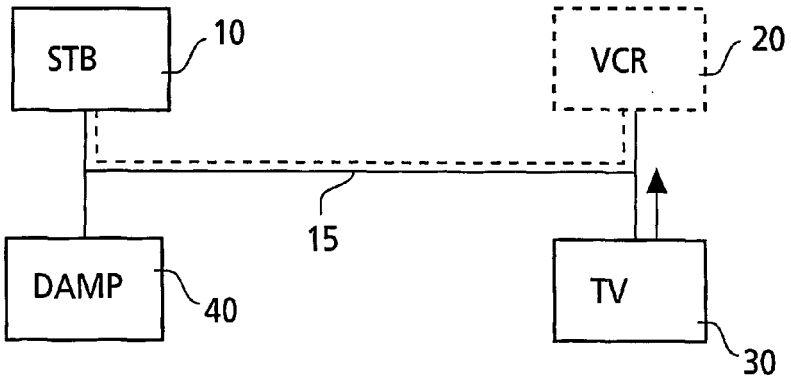

Fig.8

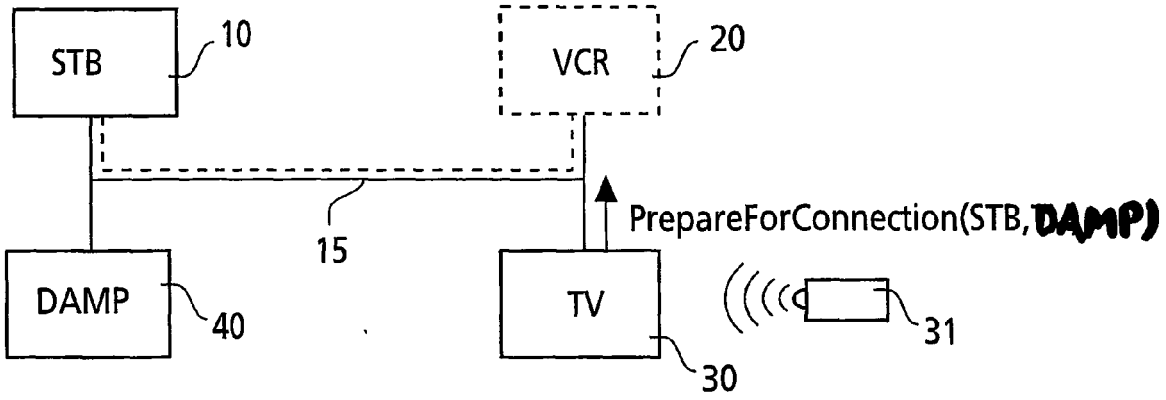
STB
10
VCR
20
15
PrepareForConnection(STB,DAMP)
DAMP
40
TV
30
31

Fig.9

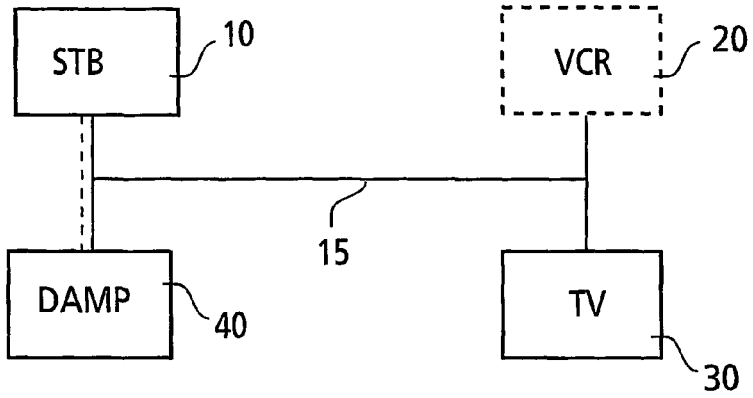
STB
10
VCR
20
15
DAMP
40
TV
30

Fig.10

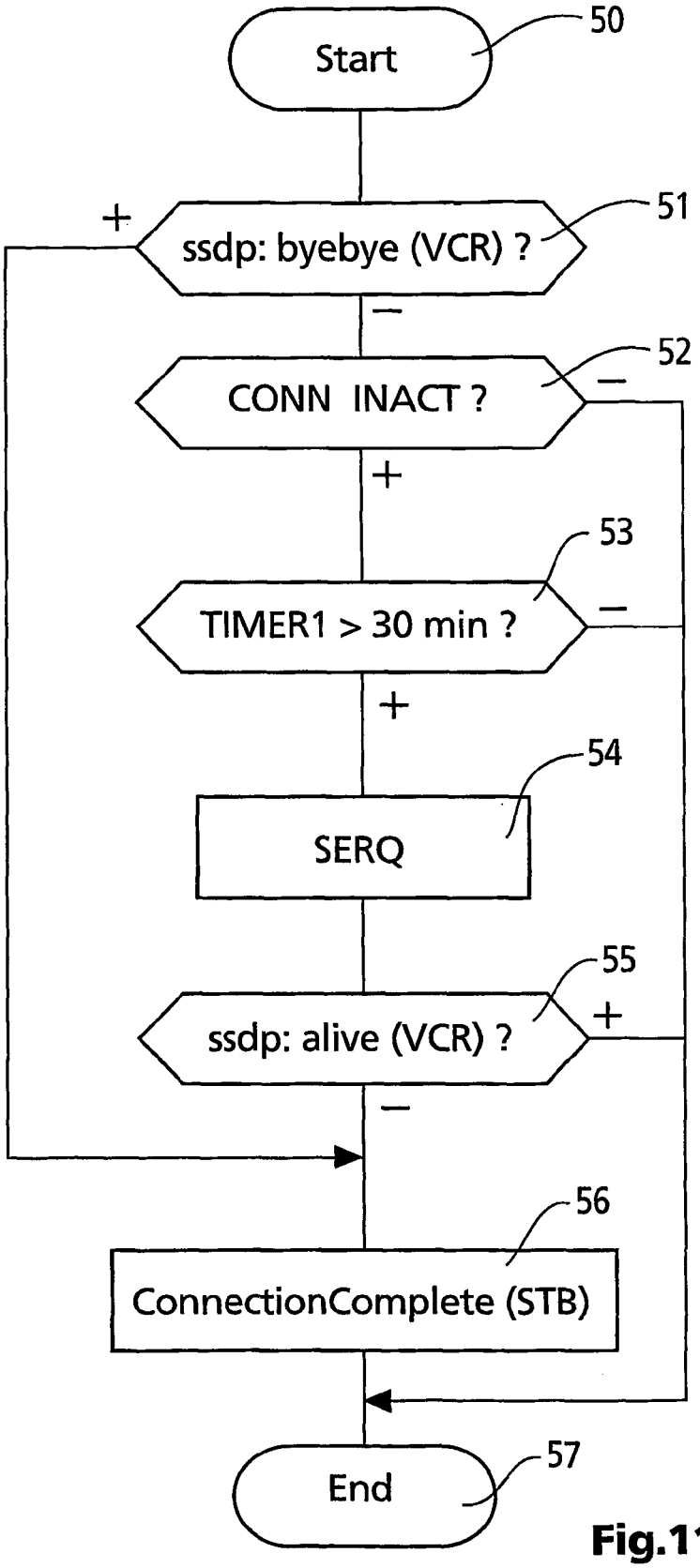
Start
50
ssdp: byebye (VCR) ?
51
+
−
CONN INACT ?
52
−
+
TIMER1 > 30 min ?
53
−
+
SERQ
54
ssdp: alive (VCR) ?
55
+
−
ConnectionComplete (STB)
56
End
57

Fig.11

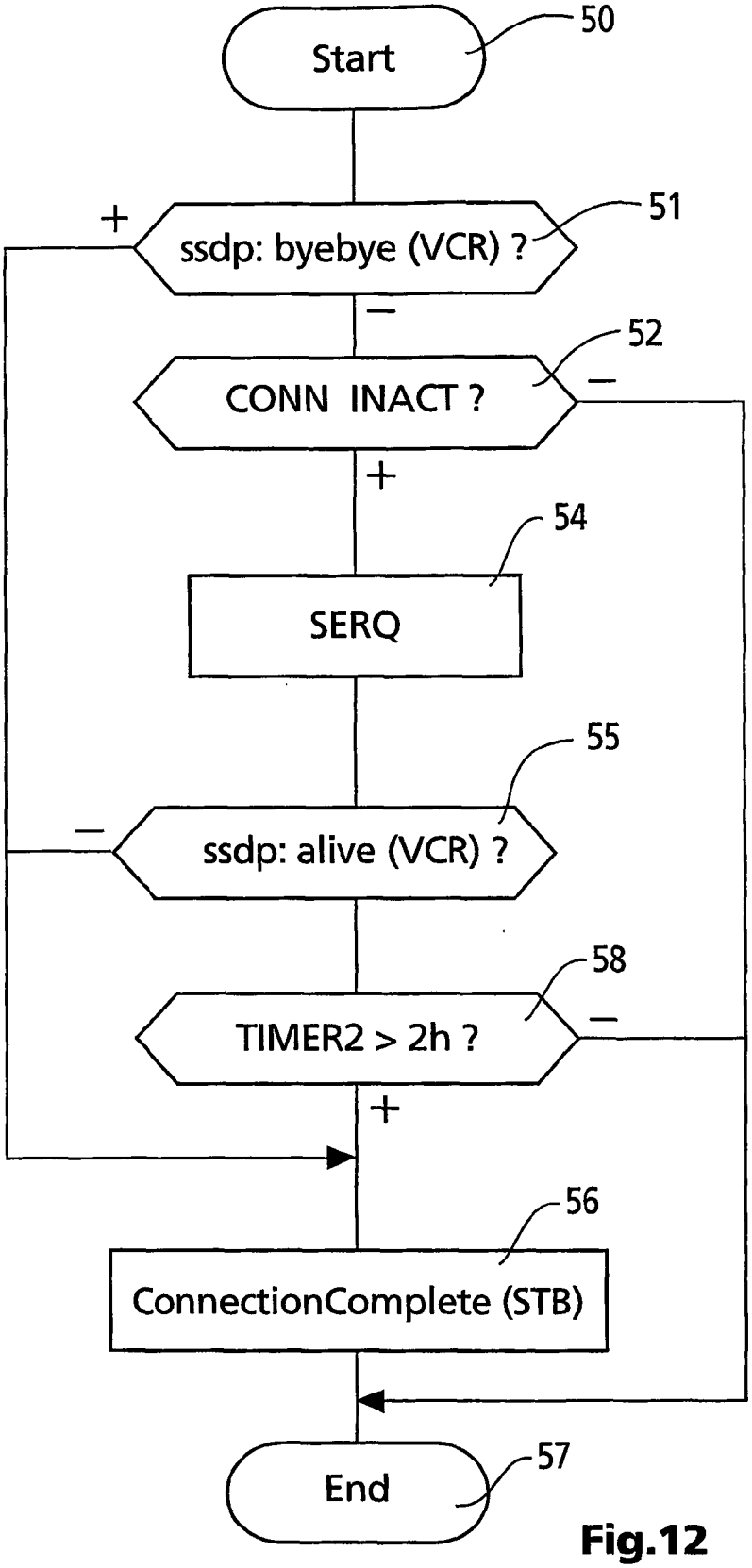
Start
50
ssdp: byebye (VCR) ?
51
+
−
CONN INACT ?
52
−
+
SERQ
54
ssdp: alive (VCR) ?
55
−
TIMER2 > 2h ?
58
−
+
ConnectionComplete (STB)
56
End
57

Fig.12