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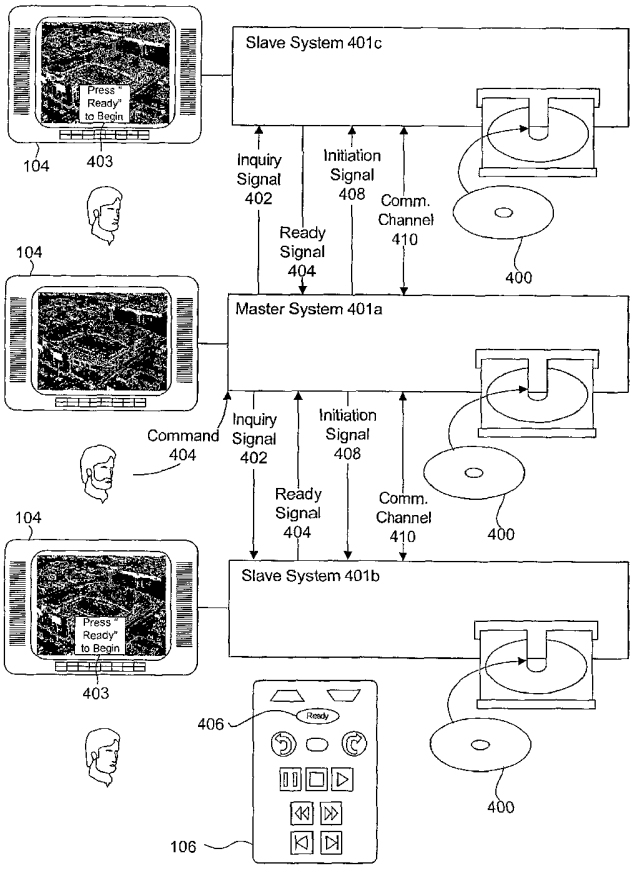
(54) Title: CONFERENCING WITH SYNCHRONOUS PRESENTION OF MEDIA PROGRAMS



(57) Abstract: A plurality of entertainment systems linked by network may synchronously present a media program, such as an audio or video program, while providing two-way audio and/or video conferencing. Each entertainment system may independently receive or access a copy of the media program. The synchronous presentation may be initiated in response to a master system (401a) receiving a predetermined number of ready signals (404) from one or more slave systems (401c, 401b). The master system may further control synchronous presentation of the media program (e.g., pause or fast forward within the media program) by transmitting control signals to each participating slave system.

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METHOD AND SYSTEM FOR SYNCHRONOUSLY PRESENTING MEDIA PROGRAMS ON MULTIPLE ENTERTAINMENT SYSTEMS

BACKGROUND

FIELD OF THE INVENTION

The present invention relates generally to entertainment systems. More specifically, the present invention relates to a method and system for synchronously presenting media programs on multiple entertainment systems.

DESCRIPTION OF RELATED BACKGROUND ART

The viewing of television programs or other forms of media, whether live or pre-recorded, is typically enhanced by watching such programs in the company of others. Certain programs are more frequently viewed by groups of people. For instance, sporting events, movies, season premieres, political debates, and other significant programs are typically viewed with family and friends.

However, being physically present in the same room is often inconvenient due to geographical distances, conflicting schedules, and the like. In such instances, viewers may watch a program individually and then meet at a later time to discuss the program. Alternatively, viewers may teleconference during an ongoing program for a more interactive discourse. Unfortunately, conventional teleconferencing presents a number of disadvantages.

For example, extended teleconferencing while watching a television program may deprive other household members of the use of a telephone. Moreover, a separate telephone receiver is typically required for each party, making teleconferencing between groups of people difficult or expensive.

Thus, it would be an advancement in the art to provide a convenient technique for conversing during presentation of a television broadcast or other media program with one or more other viewers at remote physical locations. It would be a further advancement in the art to provide a cost-effective system for audio and video conferencing which provides minimal disruption of the program being viewed.

Conventionally, in order to watch a live broadcast, viewers had little choice but to gather at a time appointed by the broadcaster. Today, however, personal video recorders (PVRs), such as TiVo®, may start recording a program when it is broadcast, but allow viewers to watch the program at any convenient time. Likewise, many programs are now available on physical media, such as digital versatile disks (DVDs), which allow people to watch programs at their convenience.

Unfortunately, no system exists for synchronizing the presentation of media programs on multiple PVRs, DVD players, or the like, at remote locations. Even if users start watching a media program at an agreed upon time, presentation may commence at different times because the users' clocks may be unsynchronized. Moreover, even if presentation begins at the same time, there is no conventional mechanism for synchronized pausing, restarting, or otherwise navigating the media program.

As a consequence, it would be an advancement in the art to provide a system and method for synchronously presenting media programs on different entertainment systems at remote locations. It would be a further advancement in the art to provide a system and method for establishing audio and/or video communication between users viewing a synchronously presented media program. It would also be an advancement in the art to provide a system and method for synchronously pausing, restarting, or otherwise navigating the media program.

BRIEF DESCRIPTION OF THE DRAWINGS

Non-limiting and non-exhaustive embodiments of the invention are described with reference to the figures, in which:

FIG. 1 is a block diagram of a communication system;

FIG. 2 is an illustration of an interactive television (ITV) system;

FIG. 3 is a block diagram of physical components of a set top box (STB);

FIG. 4 is a dataflow diagram illustrating synchronous presentation of a media program;

FIG. 5 is a timeline of communication between a master and a plurality of slave entertainment systems in an embodiment of this invention;

FIG. 6 is a dataflow diagram illustrating transmission of various control signals from a master to a plurality of slave entertainment systems;

FIG. 7 is a logical block diagram illustrating a system for synchronously playing a media program; and

FIG. 8 is a flowchart of a method of synchronously presenting a media program.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention solves the foregoing problems and disadvantages by providing a system and method for synchronously presenting a media program on a plurality of entertainment systems. As used herein, "media program" may include any type of audio and/or video program, non-exhaustive embodiments of which include television programs, movies, concerts, streaming video programs, streaming audio programs, and the like.

The media program may be provided in advance to each of the entertainment systems on physical media, e.g., DVD, CD, etc. Alternatively, the media program may be automatically or manually recorded in advance by each of the entertainment systems. For example, the entertainment systems may be embodied as personal video recorders (PVRs), which record the media program at an appointed time. In still another embodiment, the media program may be downloaded by each of the entertainment systems in real time from a server, such as a video-on-demand (VoD) server.

In one implementation, one of the entertainment systems is designated as a "master" system, while each of the other systems is designated as a "slave" system. The designation may be made by one of the users of the entertainment systems. For example, one user may designate his or her system as a master system.

In one embodiment, the master system receives a "ready" signal from one or more of the slave systems. The ready signal indicates that the user of the slave system is ready to begin watching the media program. For example, each user of a slave system may press an appropriate button on a remote control unit to indicate that the user is ready to begin the presentation.

When a predetermined number of ready signals have been received, the master entertainment system transmits an initiation signal to each slave system that is ready to present the media program. Alternatively, when a predetermined number of ready signals are received by an established time or from particular slave systems, an initiation signal may be transmitted to participating slave systems.

The initiation signal initiates synchronous presentation of the media program on the slave systems to which it is transmitted. In one embodiment, the master entertainment system also presents the media program in unison with the slave systems.

Reference throughout this specification to "one embodiment" or "an embodiment" means that a particular feature, structure, or characteristic described in connection with the embodiment is included in at least one embodiment of the present invention. Thus, appearances of the phrases "in one embodiment" or "in an embodiment" in various places throughout this specification are not necessarily all referring to the same embodiment.

Furthermore, the described features, structures, or characteristics may be combined in any suitable manner in one or more embodiments. In the following description, numerous specific details are provided, such as examples of programming, software modules, user selections, network transactions, database queries, database structures, etc., to provide a thorough understanding of embodiments of the invention. One skilled in the relevant art will recognize, however, that the invention can be practiced without one or more of the specific details, or with other methods, components, materials, etc. In other instances, well-known structures, materials, or operations are not shown or described in detail to avoid obscuring aspects of the invention.

Referring now to FIG. 1, there is shown a communication system 100 according to an embodiment of the invention. In one implementation, the system 100 includes a broadband communication network 101, such as a cable television network or direct satellite broadcast (DBS) network, although other networks are possible.

The system 100 may include a plurality of set top boxes (STBs) 102 located, for instance, at customer homes or offices. Generally, an STB 102 is a

consumer electronics device that serves as a gateway between a customer's television 104 and the network 101. An STB 102 may be embodied more generally as a personal computer, an advanced television 104 with STB-like functionality, or another type of customer premises equipment (CPE). Thus, the term "STB" should not be limited to cable or satellite equipment.

The following specification describes video communication between one or more STBs 102. However, those skilled in the art will recognize that other types of video communication devices may be used, such as dedicated videophones, personal computers, PDAs, etc.

An STB 102 receives encoded television signals and other information from the network 101 and decodes the same for display on the television 104 or other display device, such as a computer monitor. As its name implies, an STB 102 is typically located on top of, or in close proximity to, the television 104.

Each STB 102 may be distinguished from other network components by a unique identifier, number, code, or address, such as an Internet Protocol (IP) address (e.g., IPv6), a Media Access Control (MAC) address, or the like. Thus, video signals and other information may be transmitted from the network 101 to a specific STB 102 by addressing the same with the correct address, after which the network 101 routes the transmission to its destination using conventional techniques.

A remote control 106 is provided, in one configuration, for convenient remote operation of the STB 102 and the television 104. The remote control 106 may use infrared (IR), radio frequency (RF), or other wireless technologies to transmit control signals to the STB 102 and the television 104. Other remote control devices are also contemplated, such as wired or wireless mice (not shown).

Additionally, a keyboard 108 (either wireless or wired) is provided, in one embodiment, to allow a user to rapidly enter text information into the STB 102. Such text information may be used for e-mail, instant messaging (e.g. text-based chat), or the like. In various embodiments, the keyboard 108 may use IR, RF, or other wireless technologies to transmit keystroke data to the STB 102.

Each STB 102 may be coupled to the network 101 via a broadcast center 110. In the context of a cable television network, a broadcast center 110 is often

referred to as a "head-end", which is generally a centrally-located facility within a community where television programming is received from a local cable TV satellite downlink or other source and packaged together for transmission to customer homes. In one configuration, a head-end also functions as a Central Office (CO) in the telecommunication industry, routing video signals and other data to and from the various STBs 102 serviced thereby.

A broadcast center 110 may also be embodied as a satellite broadcast center within a direct broadcast satellite (DBS) system. A DBS system may utilize a small 18-inch satellite dish, which is an antenna for receiving a satellite broadcast signal. Each STB 102 may include a digital integrated receiver/decoder (IRD), which separates each channel, and decompresses and translates the digital signal from the satellite dish to be displayed by the television 104.

Programming for a DBS system may be distributed, for example, by multiple high-power satellites in geosynchronous orbit, each with multiple transponders. Compression (e.g., MPEG) may be used to increase the amount of programming that can be transmitted in the available bandwidth.

The broadcast centers 110 may be used to gather programming content, ensure its digital quality, and uplink the signal to the satellites. Programming may be received by the broadcast centers 110 from content providers (CNN®, ESPN®, HBO®, TBS®, etc.) via satellite, fiber optic cable and/or special digital tape. Satellite-delivered programming is typically immediately digitized, encrypted and uplinked to the orbiting satellites. The satellites retransmit the signal back down to every earth-station, e.g., every compatible DBS system receiver dish at customers' homes and businesses.

Some broadcast programs may be recorded on digital videotape in the broadcast center 110 to be broadcast later. Before any recorded programs are viewed by customers, technicians may use post-production equipment to view and analyze each tape to ensure audio and video quality. Tapes may then be loaded into a robotic tape handling systems, and playback may be triggered by a computerized signal sent from a broadcast automation system. Back-up videotape playback equipment may ensure uninterrupted transmission at all times.

Regardless of the nature of the network 101, the broadcast centers 110 may be coupled directly to one another or through the network 101. In alternative embodiments, broadcast centers 110 may be connected via a separate network, one particular example of which is the Internet 112. The Internet 112 is a "network of networks" and is well known to those skilled in the art. Communication over the Internet 112 is accomplished using standard protocols, such as TCP/IP (Transmission Control Protocol/Internet Protocol) and the like.

A broadcast center 110 may receive television programming for distribution to the STBs 102 from one or more television programming sources 114 coupled to the network 101. Preferably, television programs are distributed in an encoded format, such as MPEG (Moving Picture Experts Group).

MPEG is a form of predictive coding. In predictive coding, how and how much a next image changes from a previous one is calculated, and codes are transmitted indicating the difference between images, rather than the image itself. In MPEG, the images or frames in a sequence are typically classified into three types: I frames, P frames, and B frames. An I frame (or intrapicture) is an image that is coded without reference to any other images. A P frame (or predicted picture) is an image that is coded relative to one other image. A B frame (or bi-directional picture) is an image that is derived from two other images, one before and one after.

Various MPEG standards are known, such as MPEG-2, MPEG-4, MPEG-7, and the like. Thus, the term "MPEG," as used herein, contemplates all MPEG standards. Moreover, other video encoding/compression standards exist other than MPEG, such as JPEG, JPEG-LS, H.261, and H.263. Accordingly, the invention should not be construed as being limited only to MPEG.

Broadcast centers 110 may be used to enable audio and video communications between STBs 102. Transmission between broadcast centers 110 may occur (i) via a direct peer-to-peer connection between broadcast centers 110, (ii) upstream from a first broadcast center 110 to the network 101 and then downstream to a second broadcast center 110, or (iii) via the Internet 112. For instance, a first STB 102 may send a video transmission upstream to a first broadcast center 110, then to a second broadcast center 110, and finally downstream to a second STB 102.

Of course, the communication system 100 illustrated in FIG. 1 is merely exemplary, and other types of devices and networks may be used within the scope of the invention.

Referring now to FIG. 2, there is shown an interactive television (ITV) system 200 according to an embodiment of the invention. As depicted, the system 200 may include an STB 102, a television 104 (or other display device), a remote control 106, and, in certain configurations, a keyboard 108.

The remote control 106 is provided for convenient remote operation of the STB 102 and the television 104. In one configuration, the remote control 106 includes a wireless transmitter 202 for transmitting control signals (and possibly audio/video data) to a wireless receiver 203 within the STB 102 and/or the television 104. In certain embodiments, the remote control 106 includes a wireless receiver 204 for receiving signals from a wireless transmitter 205 within the STB 102. Operational details regarding the wireless transmitters 202, 205 and wireless receivers 203, 204 are generally well known to those of skill in the art.

The remote control 106 preferably includes a number of buttons or other similar controls. For instance, the remote control 106 may include a power button 206, an up arrow button 208, a down arrow button 210, a left arrow button 212, a right arrow button 214, a "Select" button 216, an "OK" button 218, channel adjustment buttons 220, volume adjustment buttons 222, alphanumeric buttons 224, a "Help" button 226, and the like.

In one embodiment, the remote control 106 includes a microphone 242 for capturing audio signals. The captured audio signals may be transmitted to the STB 102 via the wireless transmitter 202. In addition, the remote control 106 may include a speaker 244 for generating audible output from audio signals received from the STB 102 via the wireless receiver 204. In alternative embodiments, as shown in FIG. 3, the microphone 242 and/or speaker 244 may be integrated with the STB 102.

In certain embodiments, the remote control 106 further includes a video camera 246, such as a CCD (charge-coupled device) digital video camera, for capturing video signals. In one implementation, the video camera 246 is in electrical communication with the wireless transmitter 202 for sending the

captured video signals to the STB 102. Like the microphone 242 and speaker 244, the video camera 246 may be integrated with the STB 102, or attached to the STB 102, as in the depicted embodiment.

The various components of the remote control 106 may be positioned in different locations for functionality and ergonomics. For example, as shown in FIG. 2, the speaker 244 may be positioned near the "top" of the remote control 106 (when viewed from the perspective of FIG. 2) and the microphone 242 may be positioned at the "bottom" of the remote control 106. Thus, in one embodiment, a user may conveniently position the speaker 244 near the user's ear and the microphone 242 near the user's mouth in order to operate the remote control 106 in the manner of a telephone. Of course, the remote control 106 may be embodied as a standard remote control, without audio/video capture capability.

The optional keyboard 108 facilitates rapid composition of text messages. The keyboard 108 includes a plurality of standard alphanumeric keys 236. In one configuration, the keyboard 108 includes a wireless transmitter (not shown), similar or identical to the wireless transmitter 202 of the remote control 106. The wireless transmitter transmits keystroke data from the keyboard 108 to the STB 102. Additionally, the keyboard 108 may include one or more of the buttons illustrated on the remote control 106.

Alternatively, or in addition, a hands-free headset 248 may be coupled to the remote control 106 or the keyboard 108. The headset 248 may be coupled using a standard headset jack 250. The headset 248 may include a microphone 242 and/or speaker 244. Such a headset 248 may be used to reduce audio interference from the television 104 in order to improve audio quality and to provide the convenience of hands-free operation.

Referring now to FIG. 3, there is shown a block diagram of physical components of an STB 102 according to an embodiment of the invention. As noted above, the STB 102 includes a wireless receiver 203 for receiving control signals sent by the wireless transmitter 202 in the remote control 106 and a wireless transmitter 205 for transmitting signals (such as audio/video signals) to the wireless receiver 204 in the remote control 106.

The STB 102 also includes, in one implementation, a network interface 302 for communicating with the network 101 via the broadcast center 110. The interface 302 may include conventional circuitry for receiving, demodulating, and demultiplexing MPEG packets. The interface 302 may also include conventional modem circuitry for sending or receiving data. For example, the interface 302 may conform to the DOCSIS (Data Over Cable Service Interface Specification) or DAVIC (Digital Audio-Visual Council) cable modem standards.

In one configuration, one or more frequency bands (for example, from 5 to 30 MHz) may be reserved for upstream transmission. Digital modulation (for example, quadrature amplitude modulation or vestigial sideband modulation) may be used to send digital signals in the upstream transmission. Of course, upstream transmission may be accomplished differently for different networks 101. Alternative ways to accomplish upstream transmission include using a back channel transmission, which is typically sent via an analog telephone line, ISDN, DSL, or other techniques.

The STB 102 also preferably includes a codec (encoder/decoder) 304, which serves to encode audio/video signals into a network-compatible data stream for transmission over the network 101. The codec 304 also serves to decode a network-compatible data stream received from the network 101. The codec 304 may be implemented in hardware and/or software. Moreover, the codec 304 may use various standard algorithms, such as MPEG and/or Voice over IP (VoIP), for encoding and decoding.

The STB 102 further includes a memory device 306, such as a random access memory (RAM), for storing temporary data. Similarly, a read-only memory (ROM) may be provided for storing more permanent data, such as fixed code and configuration information.

In one embodiment, an audio/video (A/V) controller 308 is provided for converting digital audio/video signals into analog signals for playback/display on the television 104. The A/V controller 308 may be implemented using one or more physical devices, such as separate graphics and sound controllers. The A/V controller 308 may include graphics hardware for performing bit-block transfers (bit-blits) and other graphical operations for displaying a graphical user interface (GUI) on the television 104.

In some implementations, the STB 102 may include a storage device 310, such as a hard disk drive or the like. The storage device 310 may be configured to store encoded incoming and outgoing video signals as well as television broadcasts and retrieve the same at a later time for display. The storage device 310 may be configured, in one embodiment, as a personal video recorder (PVR), enabling scheduled recording of television programs, pausing (buffering) live video, etc. The storage device 310 may also be used in various embodiments to store viewer preferences, parental lock settings, electronic program guide (EPG) data, passwords, e-mail messages, video messages, video greetings, and the like. In one implementation, the storage device 310 also stores an operating system (OS) for the STB 102, such as Windows CE® or Linux®.

In one embodiment, a removable media storage device 310 may be provided, such as a digital versatile disk (DVD) drive, a CD-ROM drive, or the like. The STB 102 may further include standard circuitry and/or software for presenting media programs read from removable media.

As noted above, the STB 102 may include, in certain embodiments, a microphone 242 and a speaker 244 for capturing and reproducing audio signals, respectively. The STB 102 may also include or be coupled to a video camera 246 for capturing video signals. These components may be included in lieu of or in addition to similar components in the remote control 106, keyboard 108, and/or television 104.

A CPU 312 controls the operation of the STB 102, including the other components thereof, which are coupled to the CPU 312 in one embodiment via a bus 314. The CPU 312 may be embodied as a microprocessor, a microcontroller, a digital signal processor (DSP) or other device known in the art. For instance, the CPU 312 may be embodied as an Intel® x86 processor. As noted above, the CPU 312 may perform logical and arithmetic operations based on program code stored within the memory 306 or the storage device 310.

Of course, FIG. 3 illustrates only one possible configuration of an STB 102. Those skilled in the art will recognize that various other architectures and components may be provided within the scope of the invention. In addition, various standard components are not illustrated in order to avoid obscuring aspects of the invention.

Referring now to FIG. 4, a group of users at remote locations may desire to have a media program 400 synchronously presented on their respective entertainment systems 401 (e.g., interactive television systems 200, personal computers, mobile computing devices, etc.). As noted, a media program 400 may include any type of audio or video program, such as a concert, television show, movie, etc.

For instance, a group of friends may desire to synchronously view a football game previously recorded by each system 401. Further, the group members may desire to communicate with each other while watching the game using teleconferencing hardware/software supplied with their systems 401.

The systems 401 may be in electrical communication via a network 101 (not shown), which may be used for audio/video communication, as well as for transmitting control signals between the systems 401 to synchronize presentation of the media program 400. Of course, a wide variety of networks 101, including wireless technologies, may be used within the scope of the invention.

In one embodiment, each system 401 is provided with (or provided with access to) the media program 400 to be synchronously presented. The media program 400 may be provided in advance of presentation to the systems 401 in various ways. For example, as illustrated in FIG. 4, the media program 400 may be provided on a removable storage medium, such as a digital versatile disk (DVD) or compact disc (CD). Alternatively, the media program 400 may be automatically pre-recorded by each system 401 from a broadcast medium, such as a cable television network or a direct satellite broadcast (DBS) network, or even off-the-air (OTA). Various systems are known for scheduled recording of media programs 400, one example of which is a personal video recorder (PVR), such as Tivo®. Accordingly, the systems 401 may include PVR functionality.

In other embodiments, the media program 400 may be downloaded during presentation thereof from a server, such as a video-on-demand (VoD) server. The media program 400 need not be provided to each system 401 using the same technique, and various other techniques may be employed not specifically mentioned here.

In the depicted embodiment, one of the systems 401 is designated as a "master" system (referred to herein as 401a), while each remaining system 401 is

designated as a "slave" system (referred to herein as 401b, 401c, etc.) In the depicted embodiment, only two slave systems, e.g., system 401b-c, are illustrated. Of course, any number of slave systems 401b-c may be provided within the scope of the invention.

The designation of a master system 401a may be made in any suitable manner. For example, in one embodiment, the designation is made by one of the users by issuing an appropriate command 404. The command may be entered using a remote control device 106 or keyboard 108 using standard techniques. In other embodiments, the master/slave designations may be pre-defined.

Once the master/slave designations are made, the master system 401a transmits a readiness inquiry signal 402 to each of the slave systems 401b-c. The inquiry signal 402 may be embodied in any suitable form depending on the hardware and software being used.

In one embodiment, the inquiry signal 402 may include an indication of the media program 400 to be presented (e.g., the Dallas v. Denver game), the name of the user of the master system 401a, the names of users of the slave systems 401b-c, a proposed starting time, a user-defined message, etc. In response to the inquiry signal 402, the slave system 401b-c prompts its user to indicate whether he or she is ready to begin the presentation (or whether he or she will be ready at a proposed starting time). For instance, a prompt 403 may be displayed on a television 104 associated with the slave system 401b-c. The prompt 403 may ask the user to press a designated button, activate an on-screen control, or the like.

In one embodiment, the master system 401a waits until a predetermined number of ready signal(s) 404 are received at the master system 401a via the network 101. Like the readiness inquiry signal 402, the ready signal 404 may be embodied in any suitable form depending on the hardware and software in use. The ready signal 404 indicates that a user of the associated slave system 401b-c is ready for the synchronous presentation of the media program 400 to begin. A ready signal 404 may be sent to the master system 401a in response to a user of a slave system 401b-c pressing a "ready" button or control 406 or the like.

As stated above, in one configuration, the master system 401a may wait until a predetermined number of ready signals 404 have been received, or a

predetermined number of signals 404 have been received within or by an established time period. The predetermined number may be equal to the total number of slave systems 401b-c or be a subset thereof. Alternatively, the master system 401a may await receipt of a predetermined number of ready signals 404 from particular slave systems 401b-c. The predetermined number may be specified in response to a suitable user command.

Once the predetermined number of ready signals 404 has been received, the master system 401a transmits an initiation signal 408 to each slave system 401b-c from which a ready signal 404 has been received. In one embodiment, the initiation signal 408 causes each slave system 401b-c to immediately begin to present the media program 400. For example, the initiation signal 408 may be a command to play a DVD on each slave system 401b-c. In alternative embodiments, the initiation signal 408 may cause each slave system 401b-c to begin presenting the media program 400 at a specified time (i.e. the master system 401a may transmit a start time to each slave system 401b-c). For instance, a short time interval may be provided to compensate for network latency.

The initiation signals 408 transmitted to different slave systems 401b are not necessarily identical and may be transmitted at different times in view of certain factors so that presentation is as close to synchronous as possible. It should be recognized that the term "synchronous," as used herein, does not require perfect or absolute synchronization. For example, presentation of the media program 400 may be "off" by a fraction of a second for certain systems 401, but still be considered to be effectively "synchronized" from the users' perspectives.

In one embodiment, the master system 401a also begins to synchronously present the media program 400. For instance, the master system 401a may begin to present the media program 400 after transmitting the initiation signal 408. Alternatively, the master system 401a may wait until a predetermined time.

In one configuration, a communication channel 410 may be established between the master system 401a and the slave system 401b-c to enable users thereof to communicate during presentation of the media program 400 via a network 101. The communication channel 410 may enable various types of

communication, such as audio or video communication. Other types of communication are contemplated, such as instant messaging (e.g., text chat). These and other communication techniques and devices are known to those skilled in the art, and may use the various hardware and software components illustrated in FIGs. 2 and 3.

In an alternative embodiment, the inquiry signal 402 may be transmitted from a server (e.g., a broadcast center 110) coupled to both the master and slave systems 401a-c through a network 101. Also, the ready signal 404 may be received at the server so that, for example, the master system 401a may be turned off until the time for synchronous presentation arrives. The inquiry signal 402 may be transmitted, for instance, in response to a signal sent from the master system 401a to the server. Thereafter, synchronous presentation of the media program 400 may follow as a result of transmitting an initiation signal 408 from the server to both the slave and master systems 401a-c. In addition, in such an embodiment, the server may also transmit the media program 400 to the master and slave systems 401a-c.

With reference to FIG. 5, a timeline 500 of a sequence of signals 402, 404, 408 for synchronous presentation of the media program 400 is illustrated. The timeline 500 views a sequence of events from the perspective of a master system 401a. In the depicted embodiment, synchronous presentation begins when the master system 401a receives a predetermined number of ready signals 404 (e.g., three signals in the depicted embodiment).

As shown, a number of inquiry signals 402 are transmitted from a master system 401a to various slave systems 401b-c slightly after 7:00 PM. Thereafter, three ready signals 404a-c are received at the master system 401a at different times. When the third ready signal 404c is received, an initiation signal 408 is transmitted to each slave system 401b-c from which a ready signal 404a-c has been received. As explained above, the initiation signal 408 initiates synchronous presentation of the media program 400 on the slave systems 401b-c. In one embodiment, synchronous presentation may also begin on the master system 401a.

As stated above, the predetermined number of ready signals 404 may be equal to the total number of slave systems 401b-c or a subset thereof.

Alternatively, the master system 401a may await receipt of ready signals 404 from a predetermined number of particular slave systems 401b-c.

Alternatively, when a predetermined number of ready signals 404a-c are received before an established time (e.g., 8:00 pm), an initiation signal 408 will be transmitted at the established time. The established time could also include, for instance, a fixed period of time (e.g., five minutes) from transmission of an inquiry signal or signals 402. Naturally, the foregoing examples are illustrative, not limiting, of methods for determining when to transmit an initiation signal 408.

Referring now to FIG. 6, during synchronous presentation of the media program 400, a master system 401a may control various aspects of the presentation of a media program 400. For example, in response to an appropriate command, synchronous presentation of the media program 400 may be synchronously paused or restarted. To do so, the master system 401a may transmit a restart or pause signal 602, 604 to each slave system 401b-e.

In one configuration, pausing or restarting may be initiated in response to activation of a restart or pause button or control 606, 608, for example, on a remote control 106. Naturally, controls 606, 608 may be otherwise configured (e.g., embodied as on-screen controls).

In one configuration, the controls 606, 608 may be activated by a user of the master system 401a. Alternatively, the control 606, 608 may be activated by user of a slave system 401b-e and a corresponding request (e.g., to request a pause or restart) may be transmitted from the slave system 401b-e to the master system 401a. In one embodiment, the master system 401a, after receiving the requests, automatically transmits a restart or pause signal 602, 604 to each slave system 401b-e. In another embodiment, approval of a user of the master system 401a is required prior to transmission of the control signal 602, 604 to the slave systems 401b-e.

In one embodiment, synchronous presentation of the media program 400 may also include synchronously navigating within the media program. Navigation includes, for example, fast forwarding, rewinding, skipping forward or skipping backward within the media program. Skipping forward and skipping backward may include jumping to a next chapter or section marker within a DVD being presented.

In one embodiment, synchronous navigation may occur in response to activation of a rewind control (e.g., button or on-screen control) 610, fast forward control 612, skip-backward control 614, or skip-forward control 616 on a remote control 106 for the master system 401a. Following activation of the control 610, 612, 614, 616 corresponding navigation signals 618 may be transmitted to each slave system 401b-e. In one embodiment, the navigation signals 618 will result in synchronous navigation within the media program 400 among the slave systems 401b-e. As explained in connection with restarting and pausing, a user of a slave system 401b-c may in one embodiment, also control or request synchronous navigation within the media program 400. Each of the signals discussed above 602, 604, 618 may be embodied in any suitable format according to the hardware and software in use.

With reference to FIG. 7, there is shown a logical block diagram of a system 700 for synchronously playing a media program 400 on multiple entertainment systems 401a-c. The depicted logical components may be implemented using one or more of the physical components shown in FIG. 3. Additionally, or in the alternative, various logical components may be implemented as software modules stored in the memory 306 and/or storage device 310 and executed by the CPU 312. Those skilled in the art will recognize that various illustrated components may be combined together or integrated with standard components in various configurations without departing from the scope or spirit of the invention.

As explained before, one entertainment system 401 may be designated as a master system 401a, and at least one other system may be designated as a slave system 401b-c using any of the techniques described above.

In one embodiment, both the slave and master systems 401a-c may include a media interface component 702, 704 for receiving or accessing a copy of the media program 400. The media interface component 702, 704 may include, for example, a network interface 302 and suitable software for downloading media programs 400 from a network 101, such as the Internet 112. The media interface component 702, 704 may also include a DVD drive for reading a DVD including the media program 400. As explained previously, the media program 400 may be received or accessed in a variety of different ways.

In one implementation, upon receipt of an appropriate command from a user of the master system 401a, a signal transmission component 706 may transmit an inquiry signal 402 to each slave system 401b-c. Thereafter, a signal reception component 708 in each slave system 401b-c may receive the inquiry signal 402.

In one implementation, in response to receipt of an inquiry signal 402, the display component 710 displays a prompt 403, as discussed in connection with FIG. 4. A display component 710 may include, for instance, an A/V controller 308 coupled to a television 104 and/or suitable software for displaying images on the television 104.

Thereafter, a slave system or systems 401b-c may each transmit a ready signal 404 to the master system 401a. As explained before, in one implementation, when a user activates a ready button 406 at a slave system 401b-c in response to the prompt 403, a ready signal 404 is transmitted from the associated slave system 401b-c to the master system 401a.

Thereafter, a signal reception component 712 within the master system 401a may receive each transmitted ready signal 404. A signal reception component 712 may include a network interface 302 and suitable software for receiving data. In response to receipt of a predetermined number 714 of ready signals 404, as discussed above, the presentation component 716, 718 may synchronously present the media program 400 on each slave system 401b-c from which a ready signal 404 has been received and, in one embodiment, on the master system 401a.

More particularly, in one implementation, in response to receipt of a predetermined number 714 of ready signals 404, a signal transmission component 706 may transmit an initiation signal 408 to each participating slave system 401b-c. Thereafter, in response to receipt of the initiation signal 408 at a signal reception component 708 of each slave system 401b-c, the media program 400 is synchronously presented at each participating slave system 401b-c. Naturally, synchronous presentation may be delayed slightly from the time the initiation signal 408 is received to compensate for network latency and other factors. As stated before, the initiation signal 408 may, for example, be configured to initiate playback of a DVD on an associated slave system 401b-c.

In one embodiment, in response to a determination that the predetermined number 714 of ready signal(s) 404 have been received, the display component 720 synchronously presents the media program 400 on the master system 401a.

Furthermore, in one implementation, during synchronous presentation of the media program 400, a communication component 722, 724 within the master system 401a and each slave system 401b-c may establish a communication channel 410 for audio, video, or text-based communication between each of the systems 401 via a network 101. The same network 101 over which control signals are transmitted may be used to transmit communication signals so that, for example, telephone lines within a household or business remain open for other uses during synchronous viewing of the media program 400.

The communication components 722, 724 may be configured in various ways. For example, the communication component 722, 724 may use Voice over IP (VoIP) technology in the ITU-T H.323 communication protocol for audio communication between users of the systems 401. Alternatively, the communication component 722, 724 could include Logitech's® QuickCam® Express Web cam and Microsoft's® NetMeeting® software for video communication between the users. Various similar devices and software may be integrated with or used by an entertainment system 401, as will be understood by those skilled in the art.

As explained previously, synchronous presentation may also involve pausing, restarting, or navigating within the media program. In one embodiment, the presentation component 716, 718 may synchronously pause, restart, and navigate within the media program 400. For example, in one configuration, in response to receipt of a user command to pause, restart, or navigate, the signal transmission component 706 may transmit pause, restart, or navigation signals 602, 604, 618 to each slave system 401b-c. In response to receipt of the signals 602, 604, 618 at each slave system 401b-c, the media program 400 may be presented in accordance with the received signals 602, 604, 618. Naturally, pausing, restarting, or navigating may also synchronously occur on the master system 401a.

As explained previously, user commands for restarting, pausing, or navigating, may be generated in response to activation of corresponding controls

at either a master or slave system 401a-c, as discussed in connection with FIG. 6.

With reference to FIG. 8, a flowchart of a method 800 of synchronously presenting a media program 400 is illustrated. In one configuration, one of a plurality of entertainment systems 401 is designated 802 as a master system 401a, and at least one other system 401 may be designated 804 as a slave system 401b-c using any of the techniques described previously.

Thereafter, a readiness inquiry signal 402 may be transmitted 806 from the master system 401a to each slave system 401b-c. In response, a user of each slave system 401b-c is prompted 808 to activate a readiness control, such as a ready button 406 on a remote control device 106.

Thereafter, activation of a readiness control is detected 810 by at least one of the slave systems 401b-c. In response, a ready signal 404 is transmitted 812 from at least one of the slave systems 401b-c to the master system 401a.

Each transmitted ready signal 404 is received 814 at the master system 401a until a predetermined number 714 of ready signals 404 have been received 816 at the master system 401a. In response to receipt of the predetermined number 714 of ready signals 404, an initiation signal 408 is transmitted 818 to each slave system 401b-c from which a ready signal 404 has been received.

In response thereto, each slave system 401b-c that received an initiation signal synchronously presents 820 the media program 400. In one configuration, the media program 400 is also synchronously presented 822 at the master system 401a.

Based on the foregoing, the present invention offers a number of advantages not available in conventional approaches. A media program 400 may be synchronously presented at any number of remote entertainment systems 401. Moreover, synchronously pausing, restarting, fast forwarding, rewinding, and skipping within the media program 400 are also available. Simultaneous video or audio communication or textual chat between users of each participating system further enhances the viewing experience.

While specific embodiments and applications of the present invention have been illustrated and described, it is to be understood that the invention is not limited to the precise configuration and components disclosed herein. Various

modifications, changes, and variations apparent to those skilled in the art may be made in the arrangement, operation, and details of the methods and systems of the present invention disclosed herein without departing from the spirit and scope of the invention.

What is claimed is:

CLAIMS

1. A method for synchronously presenting a media program on a plurality of entertainment systems linked by network, a first entertainment system being designated as a master system and at least one other entertainment system being designated as a slave system, the method comprising:

receiving at a master entertainment system a ready signal sent by at least one slave entertainment system, the ready signal indicating that a user of the at least one slave system is ready to begin synchronous presentation of a media program;

in response to receiving a predetermined number of ready signals at the master system, transmitting an initiation signal to the at least one slave system, the initiation signal being configured to initiate synchronous presentation of the media program on the at least one slave system.

2. The method of claim 1, further comprising:

synchronously presenting the media program on the master system.

3. The method of claim 1, further comprising:

establishing two-way audio communication between a user of the master system and a user of the at least one slave system.

4. The method of claim 1, further comprising:

establishing two-way video communication between a user of the master system and a user of the at least one slave system.

5. The method of claim 1, wherein the predetermined number is equal to a total number of the slave systems.

6. The method of claim 1, wherein the predetermined number is at least a predetermined subset of the slave systems.

7. The method of claim 1, wherein the initiation signal is transmitted in response to a predetermined number of ready signals being received from particular slave systems.

8. The method of claim 1, wherein the initiation signal is transmitted in response to a predetermined number of ready signals being received within an established time period.

9. The method of claim 1, further comprising:

receiving the media program at each entertainment system.

10. The method of claim 9, wherein receiving comprises:

accessing a removable storage medium including the media program.

11. The method of claim 10, wherein the removable storage medium comprises a digital versatile disk (DVD).

12. The method of claim 9, wherein receiving comprises:

receiving the media program via a network.

13. The method of claim 9, wherein receiving comprises:

digitally recording the media program from a broadcast medium.

14. The method of claim 1, further comprising:

transmitting a readiness inquiry signal to the at least one slave system, the readiness inquiry signal being configured to cause each slave system to prompt a user thereof to indicate readiness to view the media program.

15. The method of claim 1, wherein each ready signal is received from the at least one slave system in response to a user thereof activating a readiness control.

16. The method of claim 1, further comprising:

transmitting to the at least one slave system a pause signal that synchronously pauses presentation of the media program.

17. The method of claim 16, wherein the pause signal is transmitted in response to a user of one of the entertainment systems activating a pause control.

18. The method of claim 1, further comprising:

transmitting to the at least one slave system a restart signal that synchronously restarts presentation of the media program.

19. The method of claim 18, wherein the restart signal is transmitted in response to a user of one of the entertainment systems activating a restart control.

20. The method of claim 1, further comprising:

transmitting to the at least one slave system a navigation signal that causes each slave system to synchronously navigate within the media program.

21. The method of claim 20, wherein the navigation signal is transmitted in response to a user of one of the entertainment systems activating a navigation control.

22. The method of claim 21, wherein the navigation control is selected from a group consisting of a fast-forward control, a rewind control, a skip-forward control, and a skip-backward control.

23. The method of claim 1, wherein at least one of the entertainment systems comprises an interactive television (ITV) system.

24. A method for synchronously presenting a media program on a plurality of entertainment systems linked by network, the method comprising:

designating a first entertainment system as a master system;

designating at least one other entertainment system as a slave system;

receiving a copy of the media program at the master system and at each slave system;

receiving at the master system a ready signal sent by at least one slave system; and

synchronously presenting the media program on the master system and the at least one slave system in response to receiving a predetermined number of ready signals at the master system.

25. A system for synchronously presenting a media program on a plurality of entertainment systems linked by network, a first entertainment system being designated as a master system and at least one other entertainment system being designated as a slave system, the system comprising:

a signal reception component that receives at a master entertainment system a ready signal sent by at least one slave entertainment system, the ready signal indicating that a user of the at least one slave system is ready to begin synchronous presentation of a media program;

a signal transmission component that transmits, in response to receiving a predetermined number of ready signals at the master system, an initiation signal to the at least one slave system, the initiation signal being configured to initiate synchronous presentation of the media program on the at least one slave system.

26. The system of claim 25, further comprising:

a display component that synchronously presents the media program on the master system.

27. The system of claim 25, further comprising:

a communication component that establishes two-way audio communication between the master system and the at least one slave system.

28. The system of claim 25, further comprising:

a communication component that establishes two-way video communication between the master system and the at least one slave system.

29. The system of claim 25, wherein the predetermined number is equal to a total number of slave systems.

30. The system of claim 25, wherein the predetermined number is at least a predetermined subset of the slave systems.

31. The system of claim 25, wherein the signal transmission component transmits the initiation signal in response to a predetermined number of ready signals being received from particular slave systems.

32. The system of claim 25, wherein the signal transmission component transmits the initiation signal in response to a predetermined number of ready signals being received within an established time period.

33. The system of claim 25, further comprising:

a media interface component that receives the media program at each entertainment system.

34. The system of claim 33, wherein the media interface component accesses a removable storage medium including the media program.

35. The system of claim 34, wherein the removable storage medium comprises a digital versatile disk (DVD).

36. The system of claim 33, wherein the media interface component receives the media program via a network.

37. The system of claim 33, wherein the media interface component digitally records the media program from a broadcast medium.

38. The system of claim 25, wherein the signal transmission component transmits a readiness inquiry signal to the at least one slave system, the readiness inquiry signal being configured to cause each slave system to prompt a user thereof to indicate readiness to view the media program.

39. The system of claim 25, wherein the signal reception component receives each ready signal from the at least one slave system in response to a user thereof activating a readiness control.

40. The system of claim 25, wherein the signal transmission component transmits to the at least one slave system a pause signal that synchronously pauses presentation of the media program.

41. The system of claim 40, wherein the signal transmission component transmits the pause signal in response to a user of one of the entertainment systems activating a pause control.

42. The system of claim 25, wherein the signal transmission component transmits to the at least one slave system a restart signal that synchronously restarts presentation of the media program.

43. The system of claim to 42, wherein the signal transmission component transmits the restart signal in response to a user of one of the entertainment systems activating a pause control.

44. The system of claim 25, wherein the signal transmission component transmits to the at least one slave system a navigation signal that causes each slave system to synchronously navigate within the media program

45. The system of claim 44, wherein the signal transmission component transmits the navigation signal in response to a user of one of the entertainment systems activating a navigation control.

46. The system of claim 45, wherein the navigation control is selected from a group consisting of a fast-forward control, a rewind control, a skip-forward control, and a skip-backward control.

47. The system of claim 25, wherein at least one of the entertainment systems comprises an interactive television (ITV) system.

48. A system for synchronously presenting a media program on a plurality of entertainment systems linked by network, a first entertainment system being designated as a master system and at least one other entertainment system being designated as a slave system, the system comprising:

a media interface component in a master entertainment system that receives a copy of a media program;

a media interface component in each slave entertainment system that receives a copy of the media program;

a signal reception component of the master system that receives a ready signal sent by at least one slave system; and

a presentation component that synchronously presents the media program on the master system and the at least one slave system in response to receiving a predetermined number of ready signals at the master system.

49. A system for synchronously presenting a media program on a plurality of entertainment systems linked by network, a first entertainment system being designated as a master system and at least one other entertainment system being designated as a slave system, the system comprising:

means for receiving at a master entertainment system a ready signal sent by at least one slave entertainment system, the ready signal indicating that a user of the at least one slave system is ready to begin synchronous presentation of a media program;

means for transmitting an initiation signal to the at least one slave system, the initiation signal being configured to initiate synchronous presentation of the media program on the at least one slave system in response to receiving a predetermined number of ready signals at the master system.

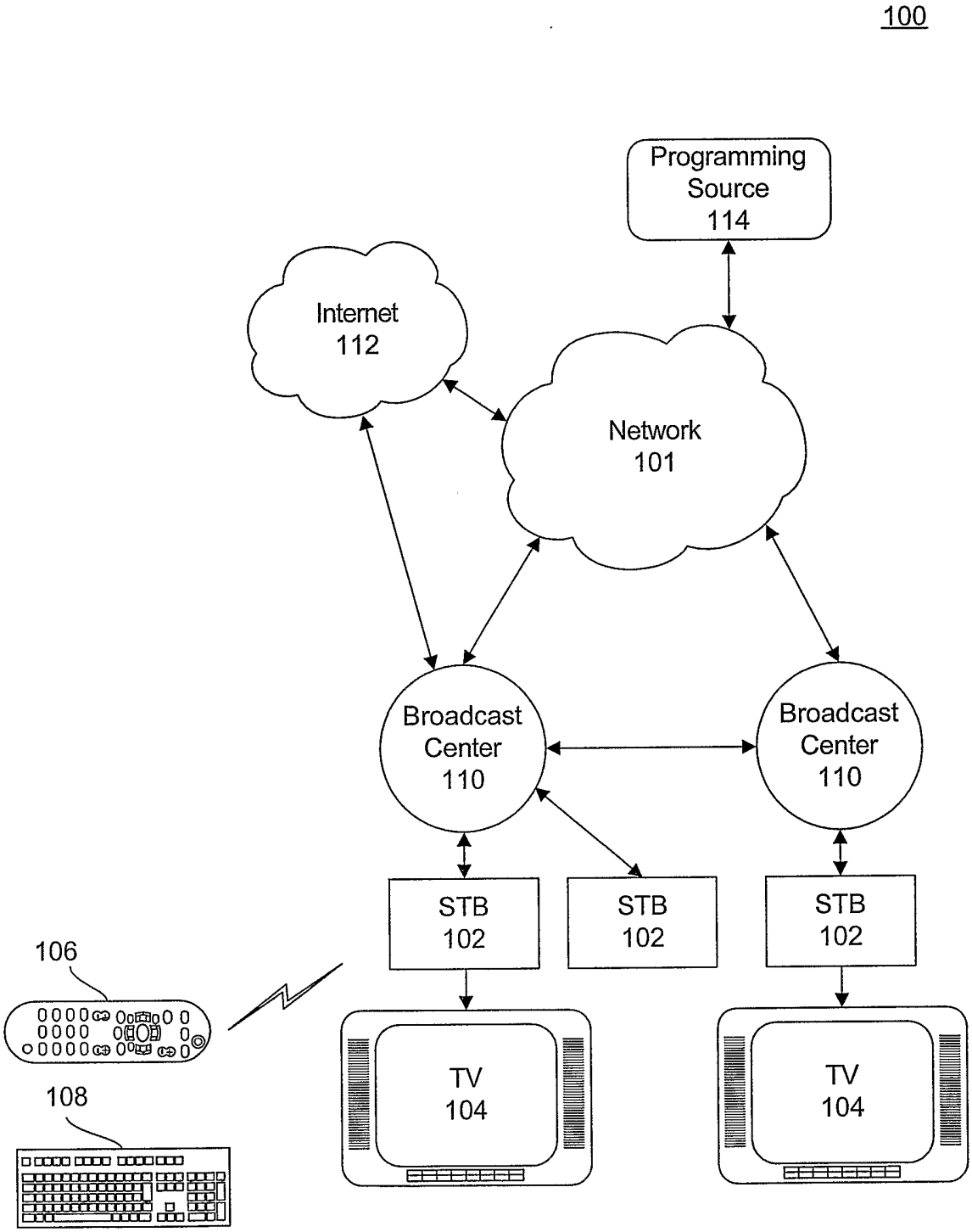
100
Programming Source 114
Internet 112
Network 101
Broadcast Center 110
Broadcast Center 110
STB 102
STB 102
STB 102
106
108
TV 104
TV 104

FIG. 1

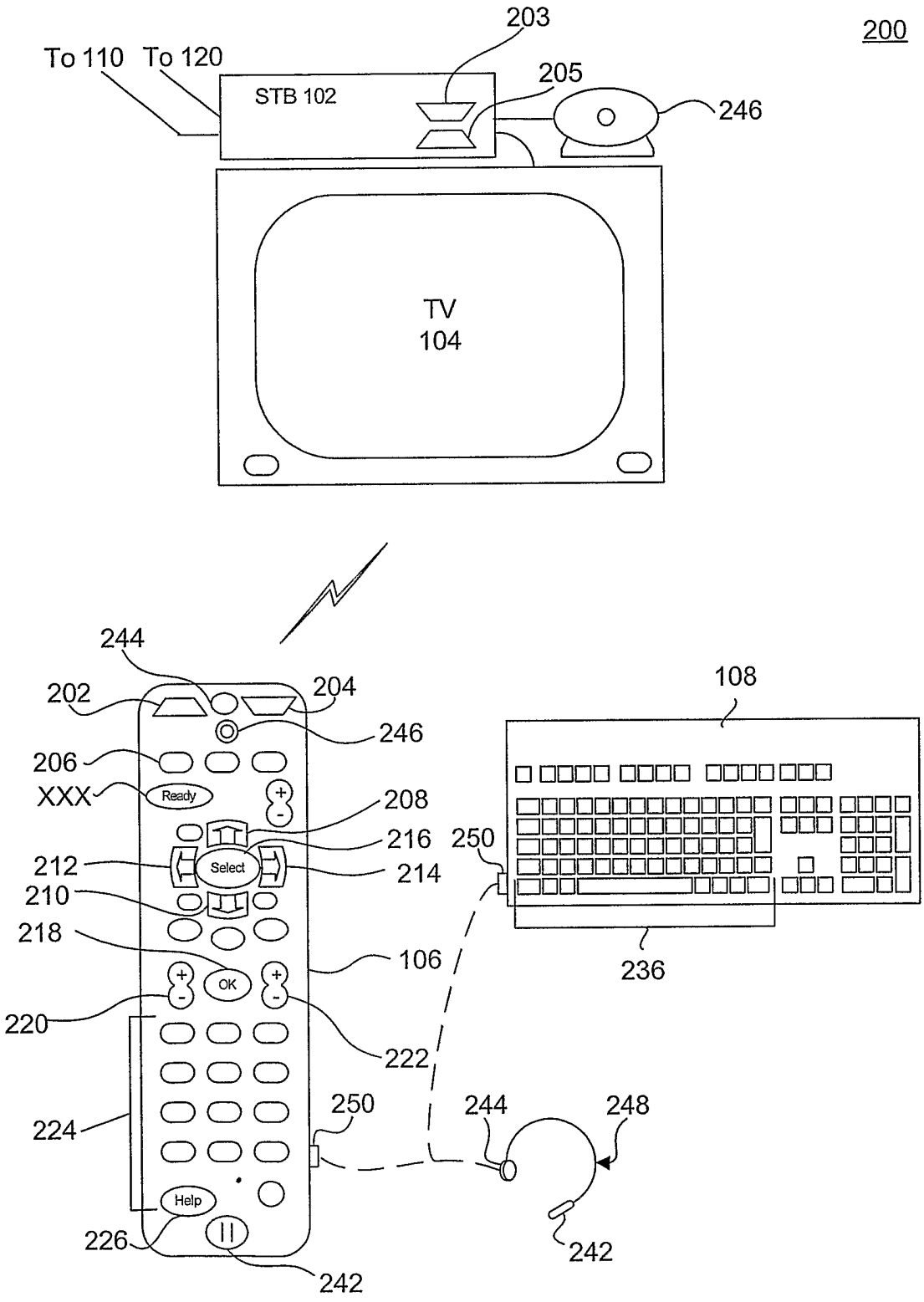
200
203
To 110
To 120
STB 102
205
246
TV
104
244
202
204
246
108
206
XXX
Ready
208
216
250
212
Select
214
210
218
106
OK
236
220
222
224
250
244
248
Help
226
242
242

FIG. 2

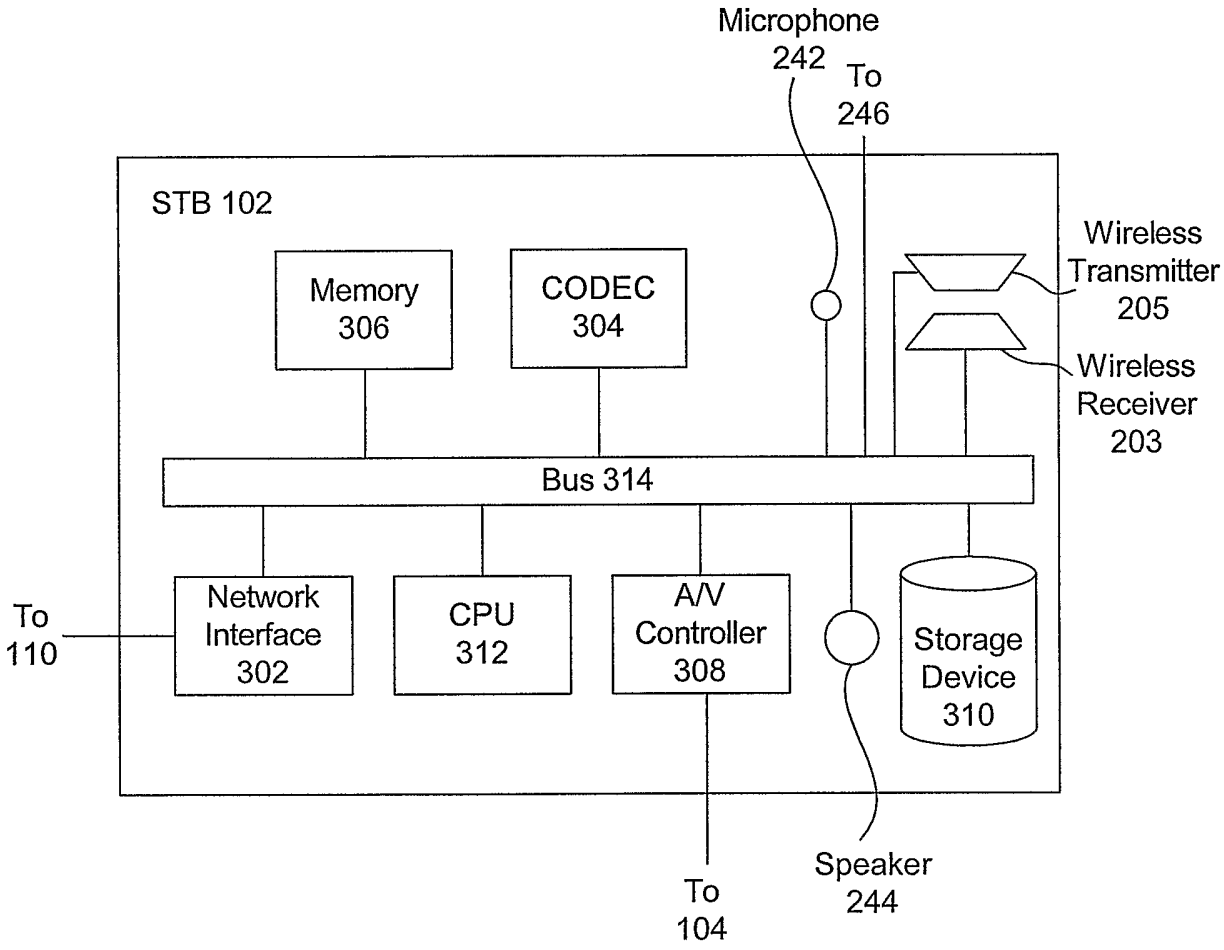
Microphone
242
To
246
STB 102
Memory
306
CODEC
304
Wireless
Transmitter
205
Wireless
Receiver
203
Bus 314
To
110
Network
Interface
302
CPU
312
A/V
Controller
308
Storage
Device
310
To
104
Speaker
244

FIG. 3

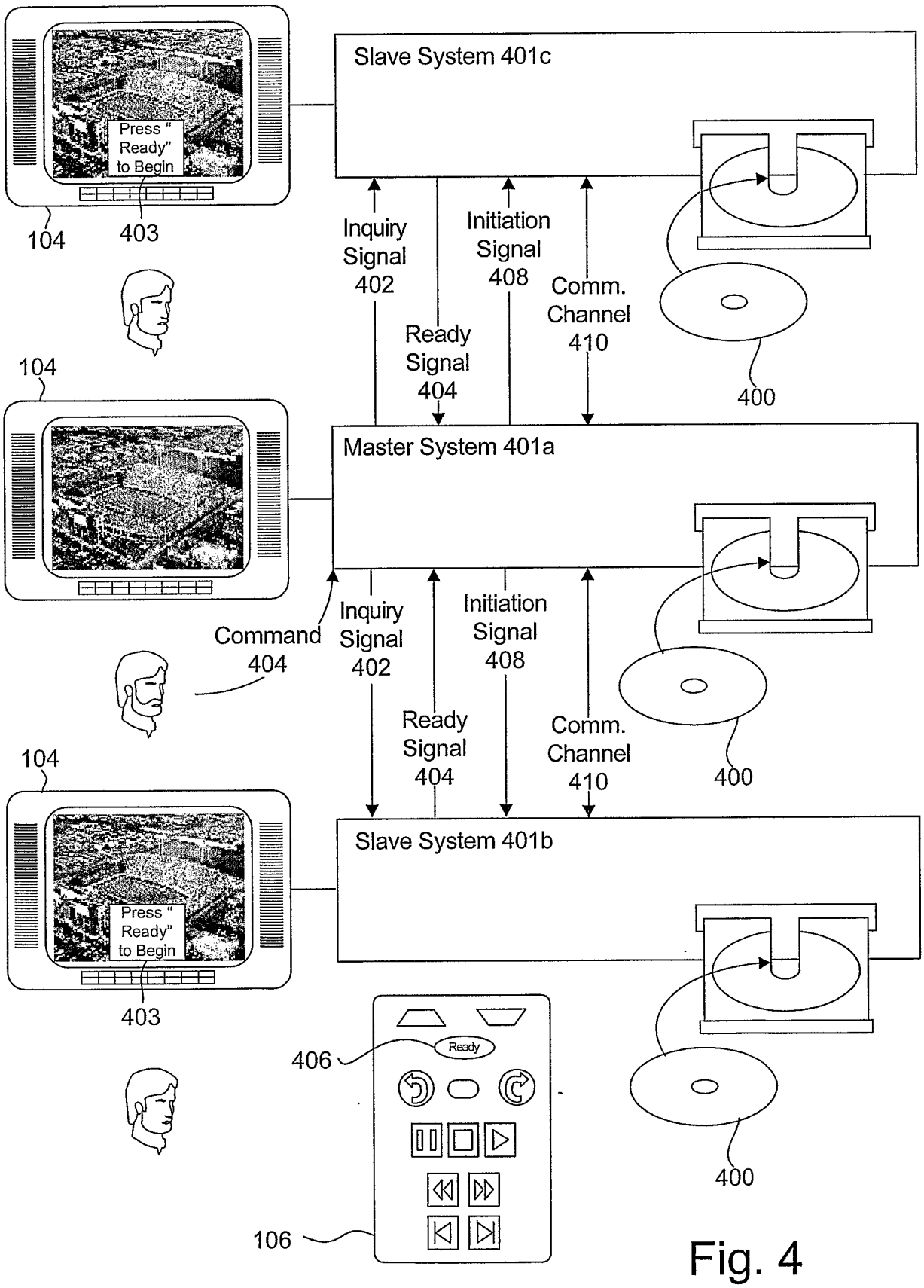
Slave System 401c
Press " Ready" to Begin
104
403
Inquiry Signal 402
Initiation Signal 408
Comm. Channel 410
Ready Signal 404
400
104
Master System 401a
Command 404
Inquiry Signal 402
Initiation Signal 408
Ready Signal 404
Comm. Channel 410
400
104
Slave System 401b
Press " Ready" to Begin
403
406
Ready
400
106

Fig. 4

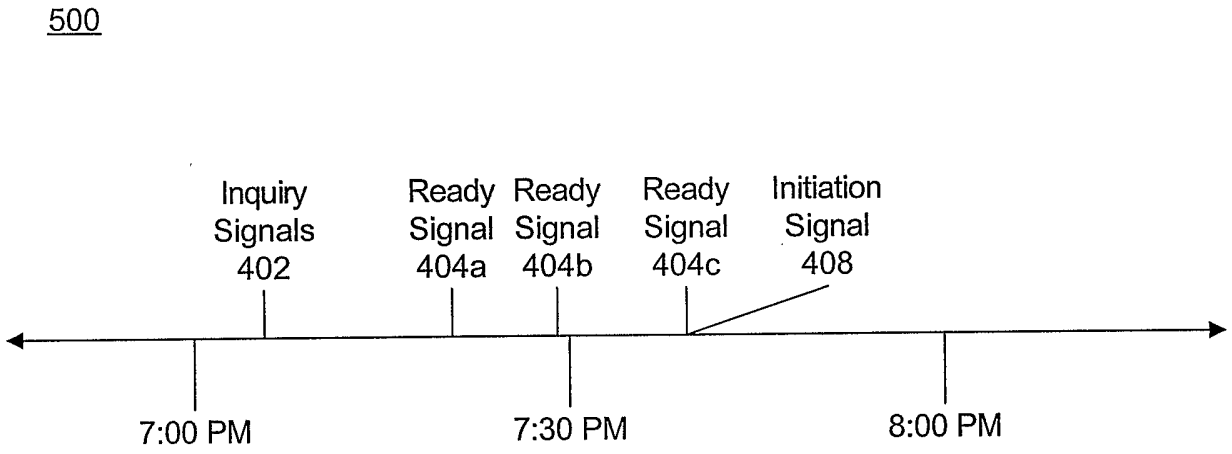
500
Inquiry Signals 402
Ready Signal 404a
Ready Signal 404b
Ready Signal 404c
Initiation Signal 408
7:00 PM
7:30 PM
8:00 PM

Fig. 5

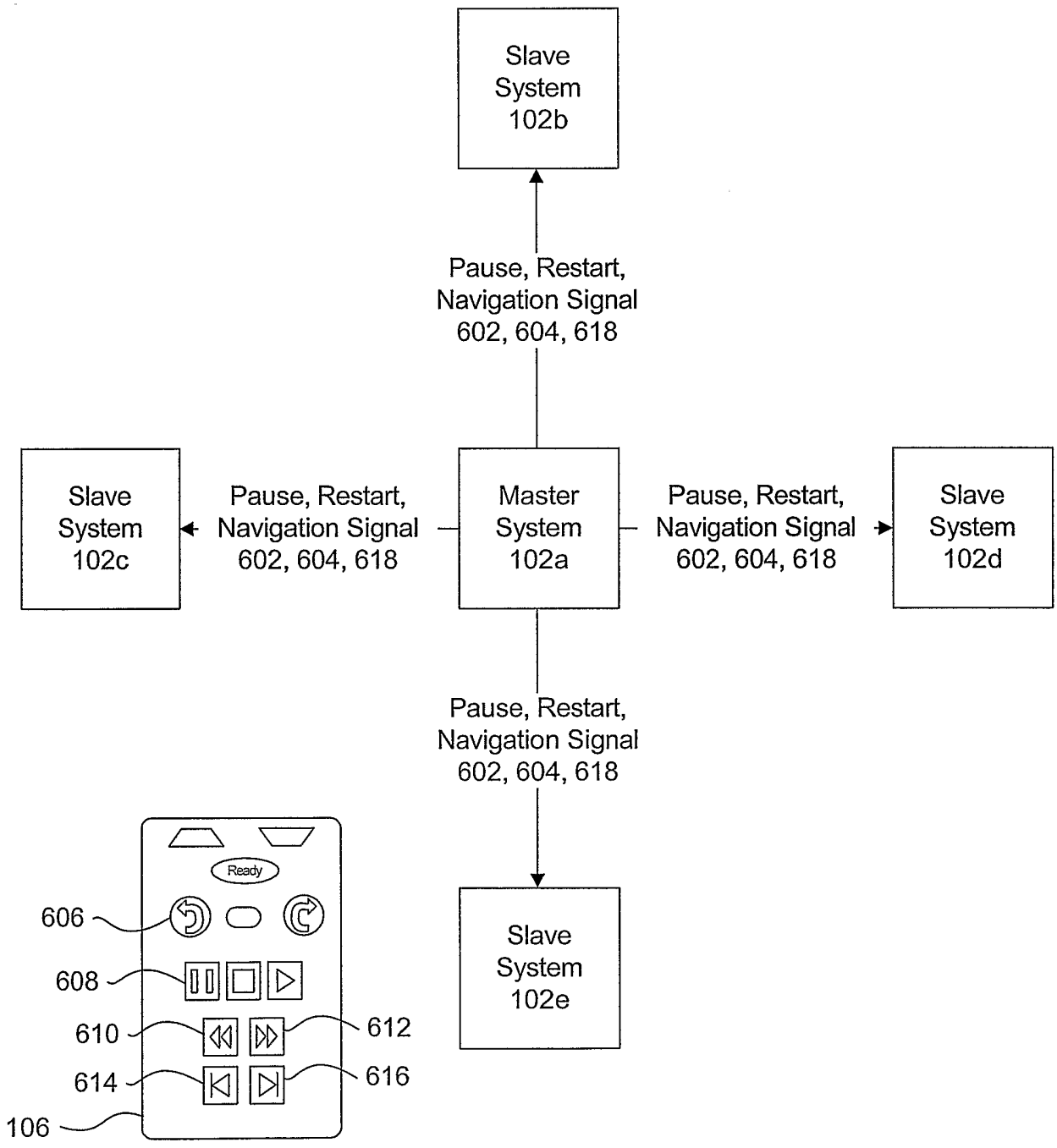
Slave System 102b
Pause, Restart, Navigation Signal 602, 604, 618
Slave System 102c
Pause, Restart, Navigation Signal 602, 604, 618
Master System 102a
Pause, Restart, Navigation Signal 602, 604, 618
Slave System 102d
Pause, Restart, Navigation Signal 602, 604, 618
Slave System 102e
Ready
606
608
610
612
614
616
106

Fig. 6

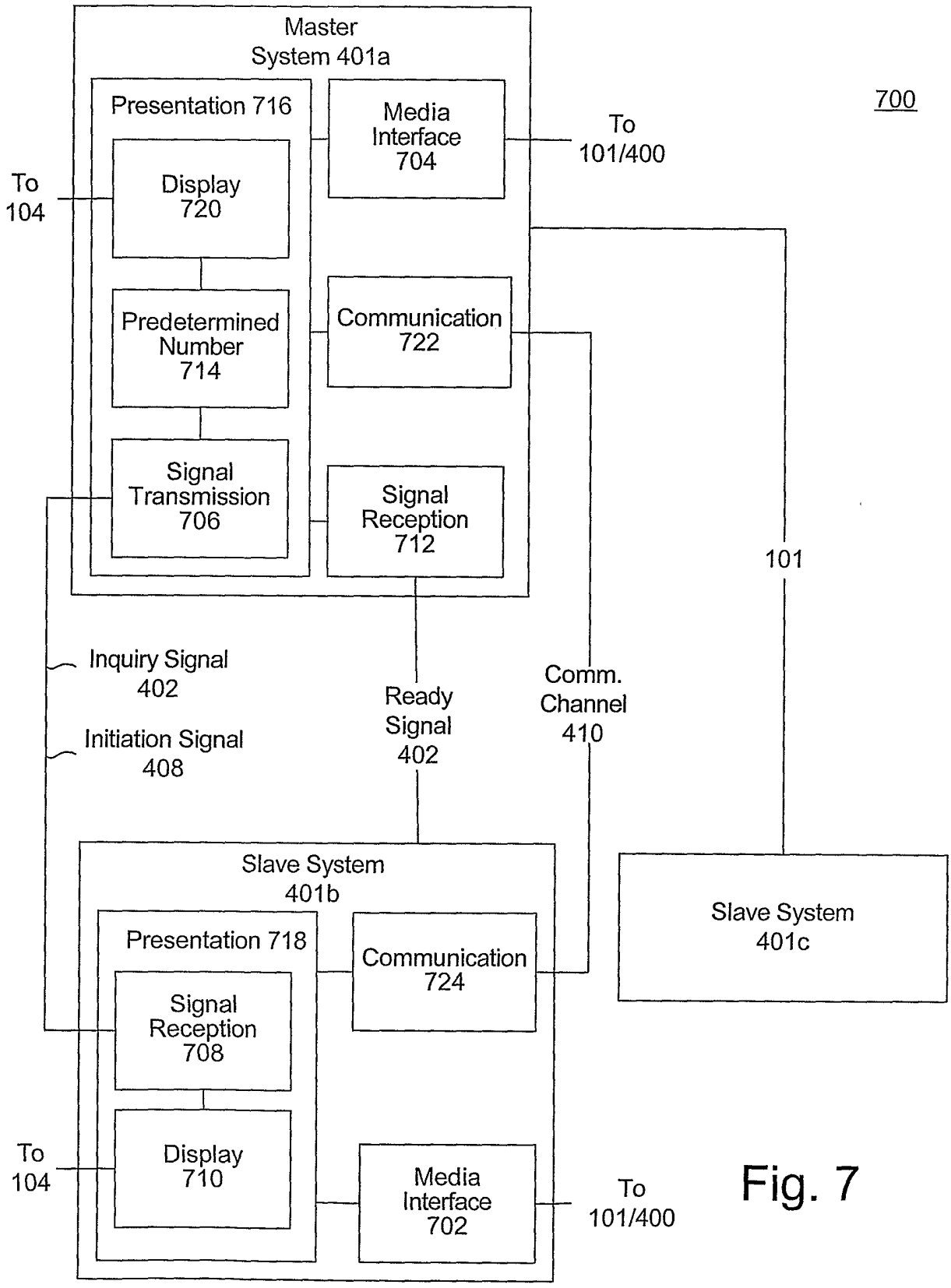
Master
System 401a
Presentation 716
Media
Interface
704
To
101/400
700
To
104
Display
720
Predetermined
Number
714
Communication
722
Signal
Transmission
706
Signal
Reception
712
101
Inquiry Signal
402
Initiation Signal
408
Ready
Signal
402
Comm.
Channel
410
Slave System
401b
Presentation 718
Communication
724
Signal
Reception
708
Slave System
401c
To
104
Display
710
Media
Interface
702
To
101/400

Fig. 7

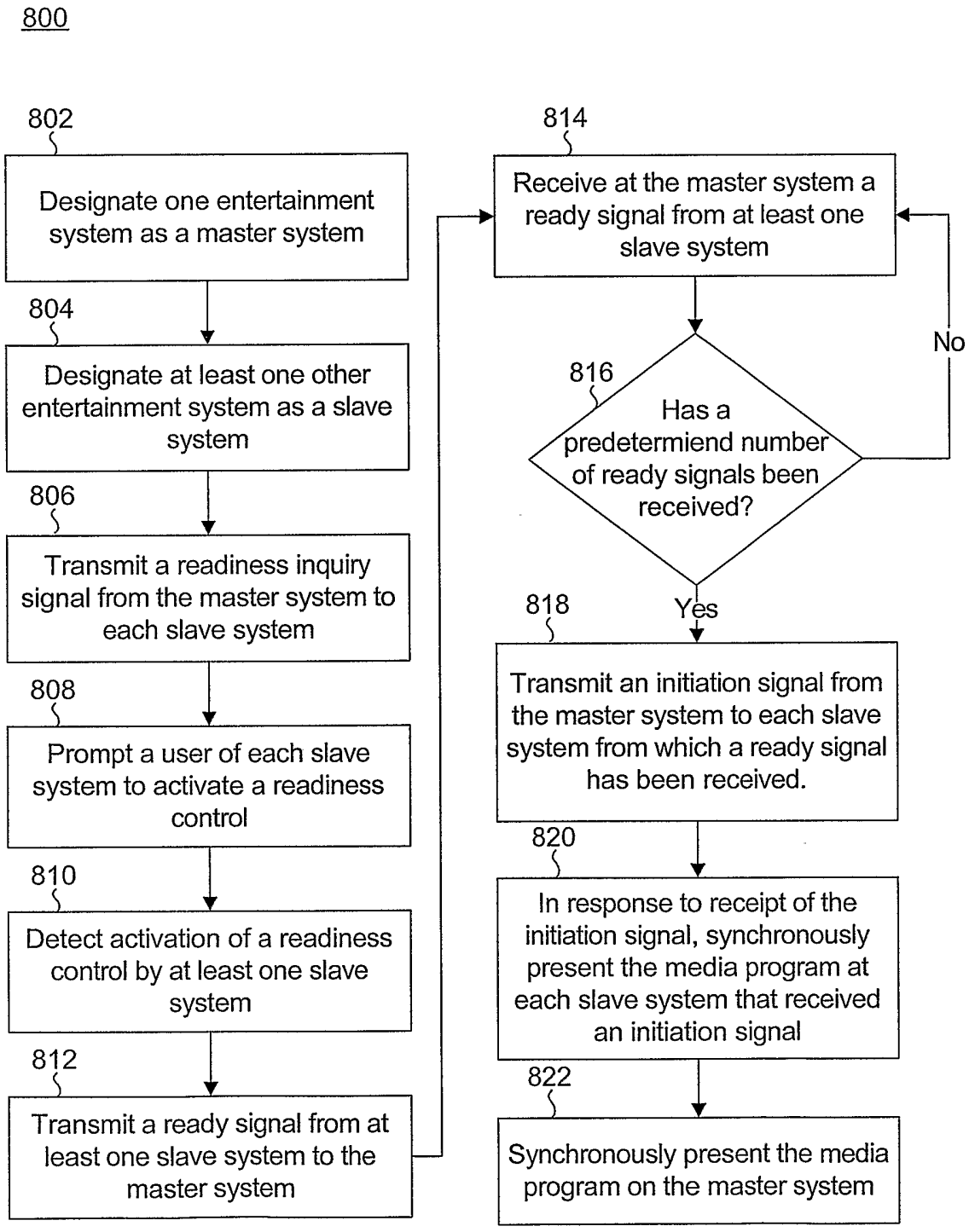
800
802
Designate one entertainment system as a master system
804
Designate at least one other entertainment system as a slave system
806
Transmit a readiness inquiry signal from the master system to each slave system
808
Prompt a user of each slave system to activate a readiness control
810
Detect activation of a readiness control by at least one slave system
812
Transmit a ready signal from at least one slave system to the master system
814
Receive at the master system a ready signal from at least one slave system
816
Has a predetermiend number of ready signals been received?
No
Yes
818
Transmit an initiation signal from the master system to each slave system from which a ready signal has been received.
820
In response to receipt of the initiation signal, synchronously present the media program at each slave system that received an initiation signal
822
Synchronously present the media program on the master system

Fig. 8

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US02/22757

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : H04N 7/14, 7/15
US CL : 725/105

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 725/105-106,118,119, 133, 134; 348/14.01, 14.08, 14.12, 500; 386/83; H04N 7/14, 7/15

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)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US 4,785,472 A (SHAPIRO) 15 November 1988 figure 1, column 5, line 48 - column 6, line 64 column 10, line 16 - column 11, line 24.	1-3,5-10,16,24-27,29-34,40,48,49 --- 4,11-13,23,28,35-37,47
Y	US 6,288,753 B1 (DENICOLA et al.) 11 September 2001 whole document	4,11-13,23,28,35-37,47
A	US 6,081,513 A (ROY) 27 June 2000 whole document	1-49

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
03 September 2002 (03.09.2002)	23 DEC 2002
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703)305-3230	Authorized officer Christopher Grant Telephone No. (703) 305-4700

Form PCT/ISA/210 (second sheet) (July 1998)