UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GOOGLE LLC,

Petitioner,

v.

SONOS, INC,

Patent Owner.

Case No. IPR2026-00020
U.S. Patent No. 11,080,001

PETITION FOR *INTER PARTES* REVIEW

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Ex. 1016	July 7, 2025 Declaration of Sonos' Expert, Dr. Kevin C. Almeroth, on indefiniteness of '001 patent claims.

Exhibit	Description
Ex. 1017	U.S. Patent No. 5,369,724 to Lim (“Lim”)

I. Relief Requested

Google LLC (Petitioner) requests *inter partes* review of claims 1-3, 6-14, 17-25, 28-33 of U.S. Patent No. 11,080,001 based on these grounds (Decl., ¶¶5-7):

Ground	Claim(s) Challenged	35 U.S.C. §	Reference(s)
1	1-2, 6-13, 17-24, 28-33	103	Janevski, Kawamura, and Okamura
2	3, 14, and 25	103	Janevski, Kawamura, Okamura, and Kono

II. The '001 Patent

A. Overview

The '001 patent relates to "synchronizing operations among a plurality of independently-clocked digital data processing devices." Ex. 1001, 1:25-29; Decl., ¶49. Those devices form a "synchrony group 20" with "a master device 21" and "slave devices 22(1) through … 22(g) … which synchronously play an audio program." Ex. 1001, 8:2-7; Decl., ¶49.

The master device 21 controls "the slave devices 22(g) in the synchrony group 20." Ex. 1001, 8:31-35; Decl., ¶50. It "receives control information from the user interface module 13 for controlling the synchrony group." Ex. 1001, 9:5-9; Decl., ¶50. The control information can "terminate playing," "skip to the next track" or "re-order tracks in a play list of tracks" to be played by the synchrony group 20. Ex. 1001, 9:31-35; Decl., ¶50.

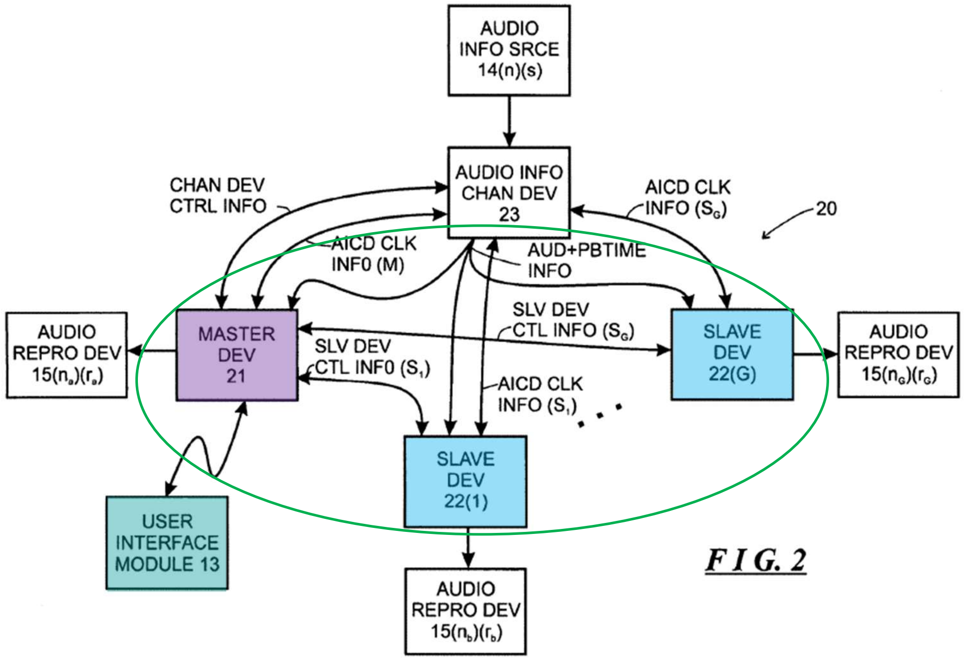


FIG. 2

Ex. 1001, FIG. 2.

"Each of the master device 21, slave devices 22(g) and audio information channel device 23 utilizes a zone player 11(n) depicted in FIG. 1." Ex. 1001, 8:7-13; Decl. at ¶51.

The "zone player[s]" "receive[] audio information" from a source 14(n)(s) and "provide[] playback and/or forward the audio information, along with playback timing information, over the local network 12 to other zone players." Ex. 1001, 5:13–18; Decl., ¶52. Those zone players can "synchronize their playback … so that the zone players … provide the same audio program at the same time." Ex. 1001, 5:21–39; Decl., ¶52.

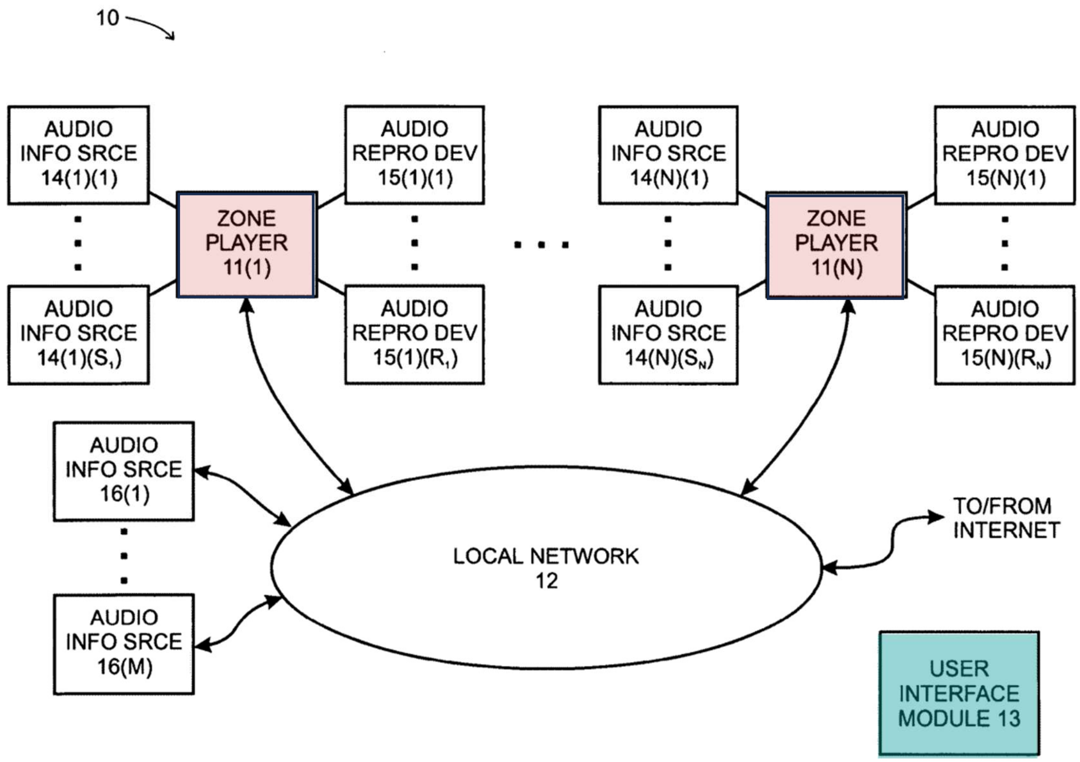


FIG. 1

Ex. 1001, FIG. 1.

B. The ’001 Patent Is Not Entitled to Priority Earlier than April 1, 2004.

Sonos filed the ’001 patent on Apr. 17, 2013, claiming priority to Jul. 28, 2003. Ex. 1001, Cover Page. The ’001 patent comes from a chain of U.S. continuations:

- No. 13/297,000 filed on Nov. 15, 2011;
- No. 10/816,217 filed on April 1, 2004.

Those applications claim priority to U.S. provisional application No. 60/490,768 filed on July 28, 2003. Ex. 1001, Cover Page. The ’001 patent claims have no priority right to that provisional because that application fails to support "generat[ing] playback timing information associated with the obtained audio information that is indicative of at least one future time relative to a reference clock time that denotes a time at which at least the first and second zone players are to engage in synchronous playback of a corresponding portion of the obtained audio information." *Compare* Ex. 1001, claims 1, 12, 23, 2:49-67, 3:1-19, 24:45-25:57; Ex. 1010 ('768 provisional application). Any possible support for these limitations was first added by application No. 10/816,217 filed on April 1, 2004. Ex. 1011. Sonos only claims priority to April 1, 2004 in the corresponding litigation. Ex. 1012.

III. Claim Construction

No claim terms need to be construed to resolve unpatentability. The Parties agreed to the following constructions, which the prior art discloses. Decl., ¶¶53-55; Ex. 1015.

"zone player"	"data network device configured to process and output audio"
"network interface"	"physical component of a device that provides an interconnection with a data network"

“playback timing information”	“information indicating when the audio [information/content] is to be played back”
“synchrony group”	“a set of two or more zone players that are to play the same audio program synchronously”

In district court, Google also proposed that the terms “audio information that is representative of the audio content” (claims 12, 23) and “audio information that is representative of the particular audio content” (claims 18, 29) are indefinite. Ex. 1012. Here, the absolute scope of “content” is a nonissue because the patent owner’s infringement allegations and expert testimony consider “audio information” as a data representation of the audio content, such as a digital file or encoded stream, and that “audio information that is representative of the audio content” includes information from any part of that file. Ex. 1016 at ¶¶64, 73–74 (“‘audio information’ is simply some representation of that underlying ‘audio content’ (e.g., a digital version, a digital encoded version, etc.)”; “audio content … embodied as a data representation for purposes of transferring … over a data network”); Ex. 1012. Janevski discloses this because its system obtains and transmits audio data for playback and also discloses comparing corresponding content or landmarks of video playbacks to be synchronized. Decl., ¶¶61-64. Because of this, the Board need not reach the question of definiteness—the patent owner's interpretation provides enough understanding of the claim scope to compare the prior art.

In district court, Google also proposed that the claim term "an individual future time" ('001 patent, claim 30) is indefinite. Ex. 1012. But the absolute scope of "future time" is a nonissue here because the Patent Owner's infringement allegations consider "an individual future time" as a specific time point, determined for a particular zone player, at which playback is to occur. Ex. 1012. The Patent Owner accuses the functionality in Cast-enabled media players, where the leader calculates a timing offset relative to a follower and adjusts timestamps on a buffered audio stream before sending the follower the audio data, so that playback timing is scheduled for a future time relative to the follower's clock. Ex. 1012, 11, 20-21. Okamura discloses this because its system uses an offset setting section that sets an offset time and adds the offset time to a time indicated by the timestamp and initiates playback when the time of the timestamp added with the offset time coincides with a current time indicated by an internal timer. Decl., ¶¶69-70. Because of this, the Board need not reach the question of definiteness—the patent owner's interpretation provides enough understanding of the claim scope to compare the prior art.

IV. Level of Ordinary Skill

A person of ordinary skill in the art ("POSITA") at the time of the purported invention would have had the equivalent of a four-year degree from an accredited institution in computer science, computer engineering, electrical engineering, or an equivalent thereof, and approximately four years of professional experience in the fields of networking and network-based systems or applications, such as consumer audio systems, or an equivalent level of skill, knowledge, and experience. Decl., ¶¶31-32, 56-58. Additional education could substitute for professional experience, and significant work experience could substitute for formal education. *Id.*

V. Overview of Prior Art

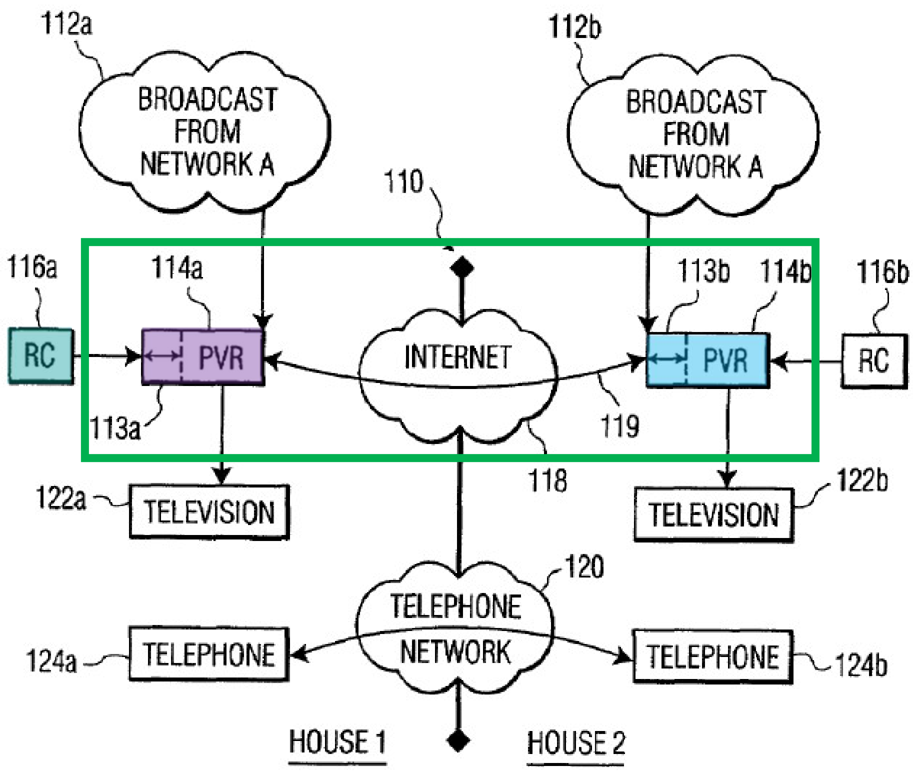
The proposed grounds apply prior art under pre-AIA §§ 102 (a) and/or (e):

Reference	Filed	Published	Statutory Basis
U.S. 7,269,338 ("Janevski") (Ex. 1005)	Dec. 11, 2001	Sept. 11, 2007	§ 102(e)
U.S. 2004/0048569 ("Kawamura") (Ex. 1006)	Aug. 4, 2003	Mar. 11, 2004	§ 102(a)
U.S. 6,751,228 ("Okamura") (Ex. 1007)	Jun. 28, 2001	Sept. 26, 2006	§ 102(e)
JP2003323186A ("Kono") (Ex. 1008)	May 2, 2002	Nov. 14, 2003	§ 102(e)

VI. Ground 1: Claims 1-2, 6-13, 17-24, 28-33 Are Rendered Obvious by Janevski, Kawamura, and Okamura.

A. Janevski (Ex. 1005)

Janevski relates "synchronizing playback of two or more digital streams based on renderable content of those streams." Janevski, 1:8-11; Decl., ¶61. Janevski discloses "a synchronized viewing session" including "PVRs 114a, b." Janevski, 6:4-18; Decl., ¶61. "[B]roadcasts 112a, b" are received by "receivers 113a, b" in "PVRs 114a, b" and can be "aural." Janevski, 16:34-43; Decl., ¶61. And a "remote control" "allow[s] the user to operate the personal video recorder 114a, b remotely." Janevski, 6:39-44; Decl., ¶61.



Janevski, FIG. 1.

A user "performs a control function (e.g., start, pause, rewind, fast forward)." Janevski, 7:31-36, Abstract; Decl., ¶62. When the user "executes a control function," it "changes the watching mode." Janevski, 8:48-52; Decl., ¶62.

Upon execution of each control function, "the initiator [PVR] directs all participants … to synchronize their playbacks to that of the initiator, whereby all playbacks are synchronized and maintain[ed] in synchronization." Janevski, 7:29-36, Abstract; Decl., ¶63. "To ensure that the PVRs 114a, b participating in the session remain synchronous," the initiator periodically sends a status message. Janevski, 7:36-50; Decl., ¶63. When "the role of initiator is handed off," "another participant 114b assumes the role of initiator PVR 114a." Janevski, 6:16-25, 7:51-57, 15:32-42; Decl., ¶63.

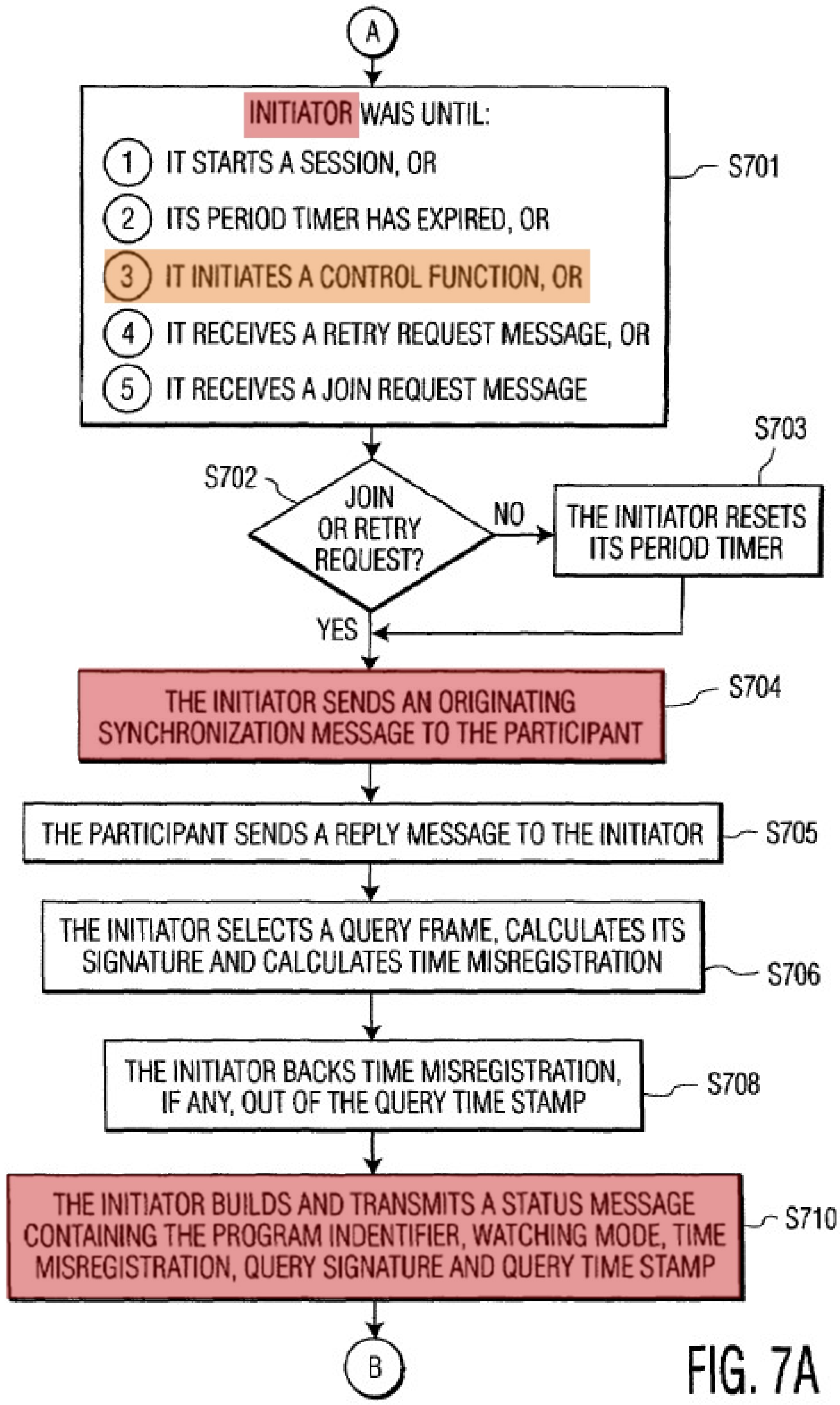


FIG. 7A

Janevski, FIG. 7A.

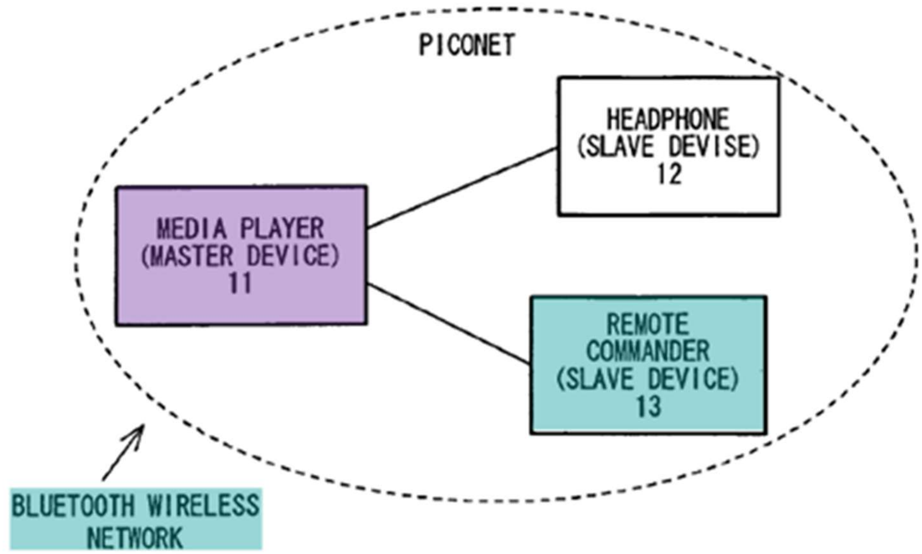
Janevski is analogous art to the ’001 patent because it is directed to the same field: controlling synchronous audio playback. *Compare* Ex. 1001, 1:25-45, 2:35-48, 5:33-39, *with* Janevski, 1:5-11, 5:3-43; Decl., ¶64.

B. Kawamura (Ex. 1006)

Kawamura relates to “exchanging device operating commands between the devices within a piconet … implemented by the BluetoothTM standard.” Kawamura, [0002]; Decl., ¶65.

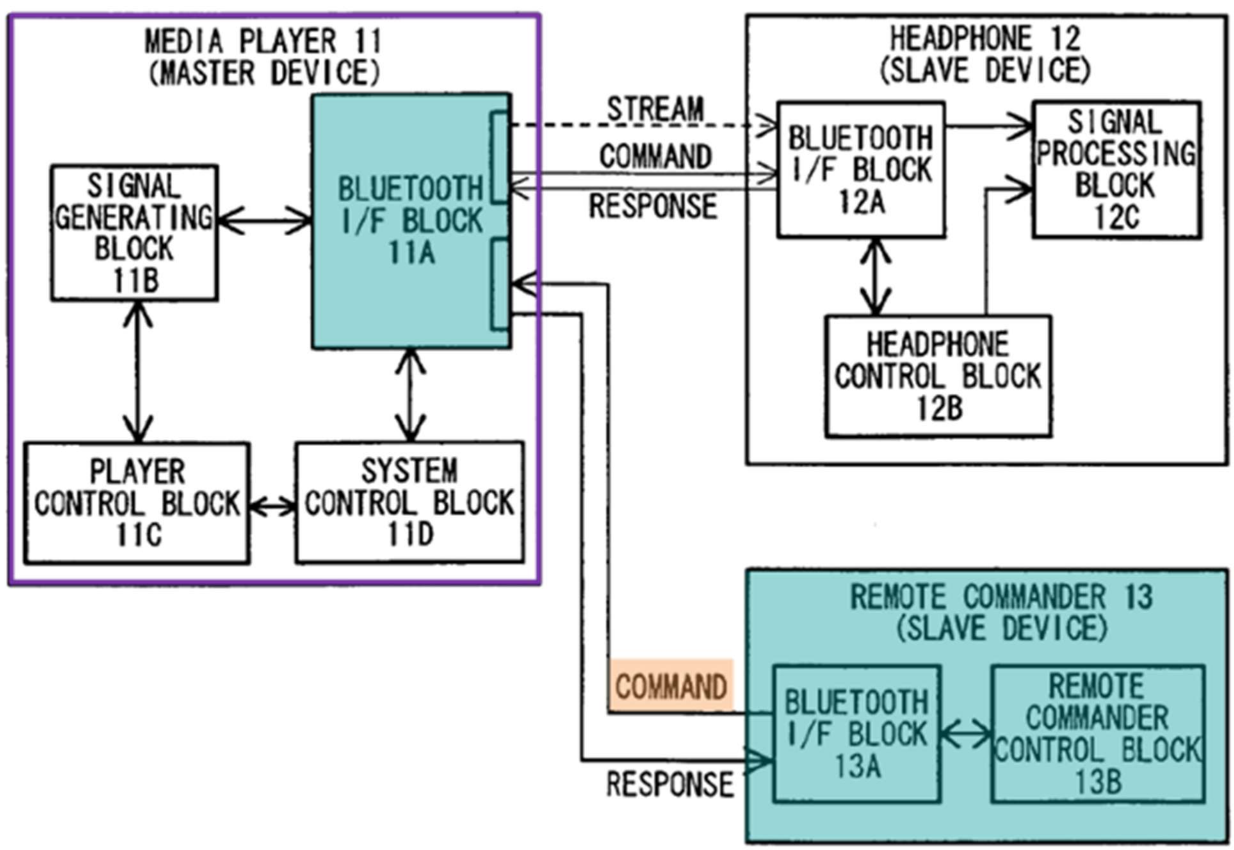
Figure 1 of Kawamura shows a “piconet 10 contain[ing] a media player 11 … and a remote commander 13.” Kawamura, [0088]; Decl., ¶66. “The remote commander 13 remotely controls the media player 11 for executing play control such as play, stop, pause, fast forward and rewind” using a “a Bluetooth interface.” Kawamura, [0090]-[0091]; Decl., ¶¶66-67.

F I G. 1



Kawamura, FIG. 1.

FIG. 2

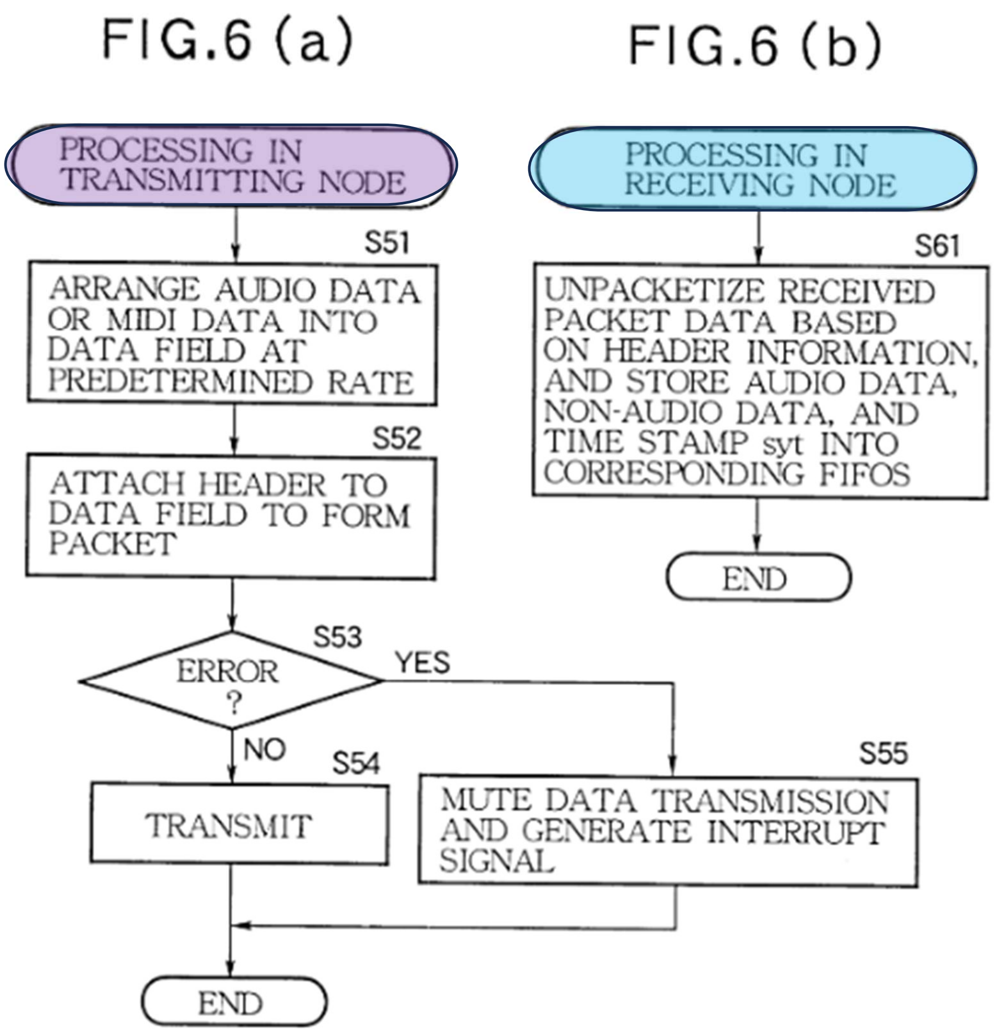


Kawamura, FIG. 2.

Kawamura is analogous art to the '001 patent because it is directed to the same field: controlling audio playback. Compare Ex. 1001, 9:5-36, claims 1, 7, 13, with Kawamura, [0088], [0206]; Decl., ¶68.

C. Okamura (Ex. 1007)

Okamura relates to synchronizing audio data reproduction between transmitting and receiving nodes. Okamura, Abstract; Decl., ¶69. The transmitting node functions as the master, generating a timestamp "on the basis of the time provided by the cycle timer," which "specifies the reproduction time at the receiving side." Okamura, 1:42–56; Decl., ¶69. The receiving node, acting as the slave, uses "an offset setting section that sets an offset time" "and adds the offset time to a time indicated by the timestamp," and initiates playback "when the time of the timestamp added with the offset time coincides with a current time indicated by an internal cycle timer." Okamura, 5:53–67; Decl., ¶69.



Okamura, FIGS. 6(a) and 6(b).

Okamura is analogous art to the ’001 patent’s approach to synchronizing playback using a reference clock, calculating time differentials, and adjusting playback timing based on local clocks. *Compare* Ex. 1001, 24:45-25:57 *with* Okamura, 1:42–56, 2:49–67, 3:1–19, 5:53–67, 24:7–25:57; Decl., ¶70.

D. Independent Claims

Janevski teaches most of claim 1, including multiple PVRs and a PVR performing the initiator role to control synchronous playback based on commands from a remote. Janevski, Abstract, 6:4-26, 15:43-47; Decl., ¶71. The PVR in the initiator role sends a sync message that includes information to identify a location in the content and associated timing information. Janevski, 7:4-25. Okamura teaches alternative timing information that identifies a future time for playback to maintain synchronous playback. Okamura, 1:42–56; 5:53–67; Decl., ¶71. Kawamura discloses that a user can send commands from a remote using a network interface, such as Bluetooth, rather than infrared. Decl., ¶71. The combination of Janevski, Okamura, and Kawamura renders obvious claim 1. *Id*.

1. Claim 1

a. [1preamble]: “A method performed by a first zone player, the method comprising:”

Janevski teaches [1preamble] because it discloses a sending PVR (first zone player) that performs a “method for synchronizing presentation from bit streams based on their content.” Janevski, 1:1-3; *id.*, 1:8-11, 13:22-24, 17:7-16; Decl., ¶72.

Janevski's PVRs "play[] back respective, identical copies of a video," which included audio, and meet the agreed upon construction of a "data network device configured to process and output audio." Janevski, 2:6–15; Ex. 1015; Decl., ¶72.

b. [1a]: "receiving, via a network interface at the first zone player, a request to engage in synchronous playback of audio content as part of a synchrony group that includes at least a second zone player that is communicatively coupled to the first zone player via at least one data network;"

Janevski in combination with Kawamura teaches [1a]. Decl., ¶73.

Janevski discloses that "PVR 114a" (first zone player) and "PVR 114b" (second zone player) form a "synchronized viewing session" (synchrony group), where the "PVR 114a" (first zone player) performs an "initiator" (master) role. Janevski, 1:13, 6:13-27, 7:57-63, 8:42-47, FIG. 1; Decl., ¶74.

Janevski's "[p]ersonal video recorder (PVR)" "114a" discloses *a first zone player*. *Id*. Janevski's "[p]ersonal video recorder (PVR)" "114b" discloses *a second zone player*. Janevski, 1:13, 6:13-27, 7:57-63, 8:42-47, FIG. 1; Decl., ¶75. Each "PVR" describes a zone player because they are "playback" devices that "playback … renderable content," including "visual" and/or "aural" information (audio content). Janevski, Abstract, 1:8-11, 2:23-45, 5:29-32, 10:30-35, 15:22-26, 16:33-43; Decl., ¶75.

Janevski's PVRs also contain at least one *network interface*. Decl., ¶76. First, as explained below, PVRs use an Internet connection that allows the first zone player to communicate with other zone players, satisfying *a network interface at the first zone player* requirement of the element. *Id*. As combined with Kawamura, the PVR would also include a second *network interface* to enable Bluetooth communication. The '001 patent similarly describes its zone players being implemented with multiple network interface devices, including those that connect zone players to a local network and those that connect the local network to external networks such as the Internet or PSTN. Ex. 1001, 4:14-21; 24:45–25:57; Decl., ¶76. Therefore, the network interface referenced in the claim may encompass multiple interfaces. Decl., ¶76.

Moreover, Janevski's disclosure of communication over the Internet "to synchronize their playbacks" (Janevski, Abstract, 6:44-49) suggests the presence of a network interface, as Internet-based communication necessarily requires such an interface. Kessler, *Overview of TCP/IP and the Internet*, 1994; Decl., ¶76. The network interface used for the Internet communication is the network interface used to send the messages for the remaining elements of claim 1. *Id*.

The "PVR" "114a" and "PVR" "114b" playback audio content in "a synchronized viewing session," which discloses *a synchrony group* comprising the two zone players "PVR" "114a" and "114b." Janevski, 6:4-38, FIG. 1; *id.*, Abstract, 5:50-51, 7:4-16, 7:25-50, 11:4-11, 12:41-46; Decl., ¶77. Figure 1 illustrates the "synchronized viewing session," where "[t]he Internet 118 [the claimed *data network*] supplies the means 119 for communicating information between the PVRs 114a, b such that synchronization may be achieved." Janevski, 6:48-51; Decl., ¶77. Accordingly, the devices are *communicatively coupled*. Decl., ¶77.

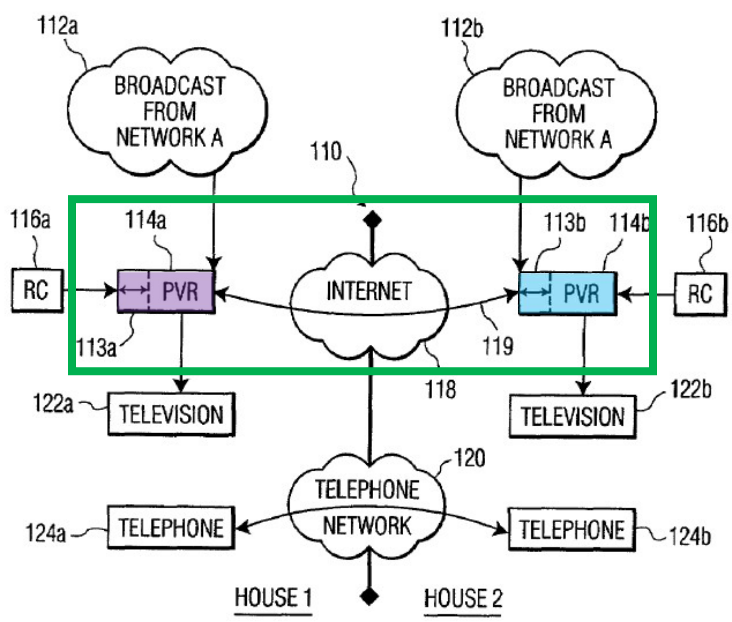


FIG. 1

Janevski, FIG. 1.

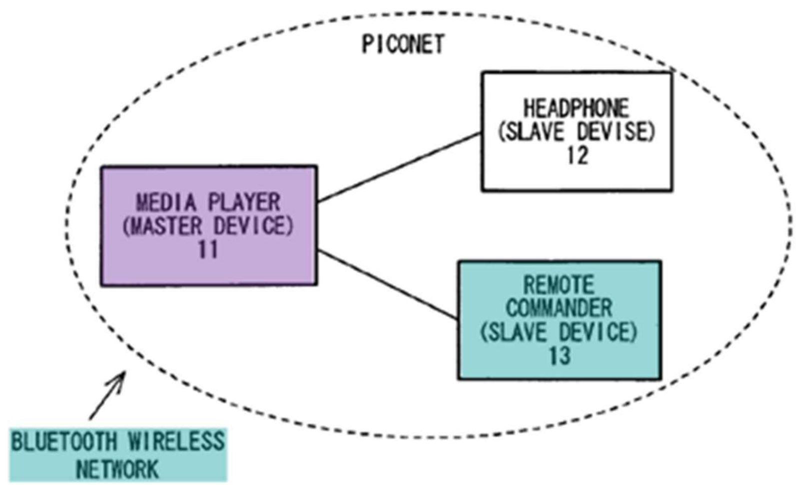
Janevski teaches *a request to engage in synchronous playback* because it discloses a control command from a remote control connected to the initiator PVR 114a activates a menu for synchronized playback and sends the menu for synchronized playback to the other participants. Janevski, 7:4-16; Decl., ¶78. In Janevski, "user 1 takes the lead as the 'initiator', user 1, via a remote control 116, via controls on the PVR 114a itself, … [which] would activate a menu for synchronized viewing on the PVR 114a." Janevski, 7:4-9; Decl., ¶78. Then, user 1 would respond to and send the menu. Resulting other menus would be sent to user 2." Janevski, 7:9-10; Decl., ¶78. That user 2 would also use a remote with the menu to also request to engage in synchronous playback. Janevski, 7:4-24; Decl., ¶78.

Kawamura teaches that it was also known to receive commands from a "remote commander" via a "Bluetooth interface" (*via the network interface*) instead of using infrared. Kawamura, [0088]-[0090]; Decl., ¶79.

In Janevski's exemplary embodiment, the "PVR 114a includes … a remote control sensor 204," which "receives a signal from the remote control 116." Janevski, 7:51-8:1; Decl., ¶80. But Janevski is not limited to this configuration. While Janevski's "remote control" is "typically" "configured to transmit an infrared signal," a POSITA would have understood other wireless communication techniques were compatible with and advantageous for Janevski. Janevski, 6:40-44; Decl., ¶80.

Kawamura discloses one known suitable option to replace infrared – Bluetooth. Decl., ¶81. Kawamura discloses a Bluetooth "piconet 10" including "media player 11 … and a remote commander 13." Kawamura, [0088], [0090]-[0091], FIGs. 1, 2. Within the piconet, "[t]he remote commander 13 remotely controls the media player 11 for executing play control such as play, stop, pause, fast forward and rewind," which discloses a controller device transmitting playback commands to the media player. Kawamura, [0088]; Decl., ¶81.

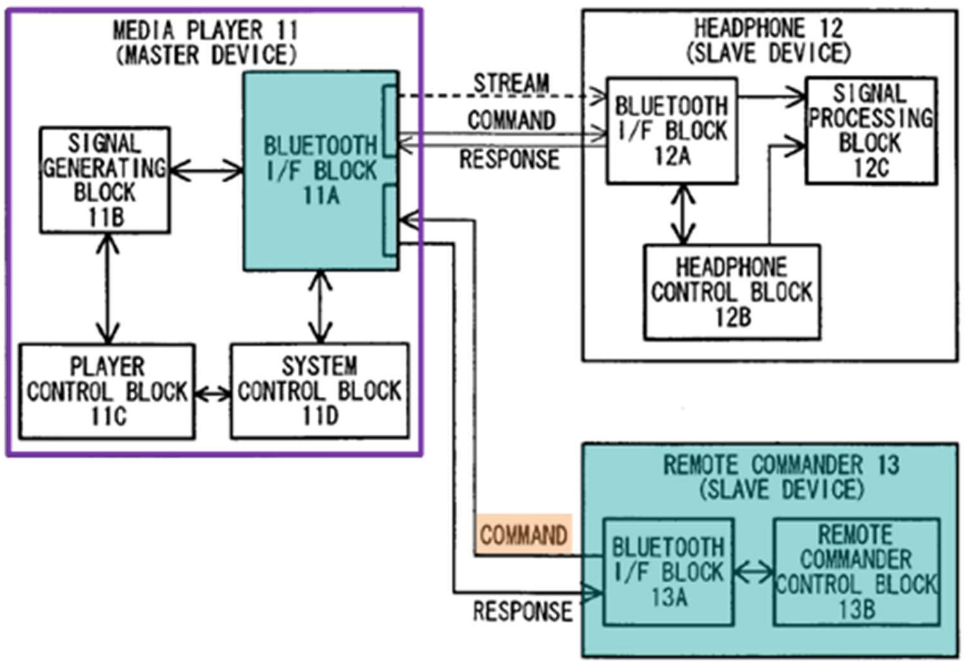
F I G. 1



Kawamura, FIG. 1.

Kawamura's "media player" includes "a Bluetooth interface," which is a network interface that connects to the "Bluetooth wireless network." Kawamura, [0090]-[0091], FIGs. 1-2; Decl., ¶82. The "Bluetooth interface" of "media player" implements "Bluetooth wireless connection in piconet 10 and transfer[] commands and responses with the … [remote commander] 13." Kawamura, [0090]-[0091], FIGs. 1-2. Kawamura's "remote commander" similarly includes "a Bluetooth interface" which "transfers commands and responses with the [media player] 11." Kawamura, [0100]-[0104]; Decl., ¶82. Thus, Kawamura's "media player" (zone player) receives "commands" from the "remote commander" (network device) via the "Bluetooth interface." (network interface). Kawamura, [0088], [0090]-[0091]; Decl., ¶82.

F I G. 2



Kawamura, FIG. 2.

As combined, Kawamura's "remote commander" would have served as Janevski's "remote control" and Janevski's "PVR 114a" would have received its "control function" via Kawamura's "Bluetooth interface." Decl., ¶83.

A POSITA would have sought Bluetooth solutions because Kawamura teaches that "short-distance wireless communication," including "Bluetooth," is "expected a great deal" for use "as the transmission media for home networks." Kawamura, [0003]-[0005]; Decl., ¶84. Kawamura also teaches that "obviously, [Bluetooth] is also designed for the application to stationary equipment" including "a stereo unit (or other media players)." Kawamura, [0010]; Decl., ¶84.

A POSITA would have recognized that infrared communications (as in Janevski's exemplary embodiment) are limited to line-of-sight transmission. Decl., ¶85. The prior art explains that "[m]any video sources, especially VCRs and cable converters, are designed to cooperate with hand-held controllers that send out infrared control signals upon command of the user," but "[u]nfortunately signals from these devices do not travel between rooms unless there is a line-of-sight path between transmitter and source." Goodman, 4:43-49; Braithwaite, 1:54-60; Decl., ¶85. So a POSITA would have been motivated to implement Kawamura's Bluetooth remote to improve communications and successfully transmit commands to Janevski's PVR even when walls, furniture, people, or other household obstacles obstructed the line-of-slight. Decl., ¶85.

A POSITA would have reasonably expected success because Janevski and Kawamura use similar components in similar ways to achieve similar goals, e.g., AV media players, control signals, and remote controllers. Kawamura, [0088]-[0091], [0206]; Janevski, 6:4-44; Decl., ¶¶86-88. Moreover, "because Bluetooth is a worldwide standard … the globalization of communication environments may be promoted with ease." Kawamura, [0011]; Decl., ¶¶86-88. Kawamura's system also uses "a conventional Bluetooth control profile such as AV Remote Control Profile."

Kawamura, [0023]; Decl., ¶¶86-88. Janevski's "PVR 114a" is also already configured with an Internet network interface ("receiver[] 113a") as explained above. Janevski, 7:57-63; 6:6-16; Decl., ¶¶86-88. Thus, implementing Kawamura's Bluetooth "remote and interface in Janevski (to the extent not expressly disclosed) would have used known features according to their known functions (remote controls and Bluetooth), to achieve predictable results (Janevski's PVR receives the control function via a Bluetooth interface). Decl., ¶¶86-88.

Janevski's "receiver" and Kawamura's "Bluetooth interface" meet the construction of "physical component of a device that provides an interconnection with a data network" because they are physical components that connect to the "Internet" and "Bluetooth" networks, respectively. Janevski, 7:57-63; 6:6-16; Kawamura, [0088]-[0091], Decl., ¶89.

Therefore, Janevski when combined with Kawamura teaches receiving, via a network interface at the first zone player, a request to engage in synchronous playback of audio content as part of a synchrony group that includes at least a second zone player communicatively coupled to the first zone player via at least one data network. Decl., ¶90.

c. [1b] "after receiving the request to enter into the synchrony group:"

Janevski in combination with Kawamura teaches [1b] because Janevski discloses that its synchronization process occurs after the request to participate in a synchronized viewing session and the corresponding responses are received. Decl., ¶91; Janevski, 7:25-50. Specifically, Janevski discloses that "[b]ased on the responses, synchronized viewing session is established to begin at an agreed upon time." Janevski, 7:14-16; Decl., ¶91. Alternatively, a user may initiate a request to engage in synchronous playback of audio via the Bluetooth interface by the user of Janevski's PVRa as modified by Kawamura's teachings. Decl., ¶91.

d. [1ci] "detecting an indication that the first zone player is to operate in (a) one of a control-master mode or a control-slave mode for the synchrony group"

Based on Sonos' apparent infringement interpretation, Janevski teaches [1ci] by disclosing that Janevski's PVR synchronized viewing system dynamically assigns roles based on user actions after the synchronized viewing session is started. Janevski, 8:48-52; Decl., ¶92; Ex. 1012. In Janevski, "[e]ach time that a participant changes the watching mode – i.e. executes a control function (rewind, fast forward, etc.) – that participant broadcasts a command to all other participants (including the 'current' initiator) and thereby becomes the new initiator." *Id.* This broadcasted command is the ***indication*** detected by the system to determine role assignment. Decl., ¶92.

The first zone player detects that it is to operate in control-master mode when it "executes a control function … [and] broadcasts a command" to all participants "and thereby becomes the new initiator." Janevski, 8:48-52; Decl., ¶93. This confirms that Janevski's PVR synchronized viewing system detects the control function from the user's remote control as an indication that the device should assume the initiator role (control-master mode). Decl., ¶93.

Conversely, the first zone player detects that it is to operate in control-slave mode when it receives a command broadcasted by another PVR that executed a control function and assumed the initiator role. Janevski, 8:48-52; Decl., ¶94. Janevski discloses that "the initiator performs the same process to synchronize each participant, whereby all participants become synchronized." Janevski, 8:42–47; Decl., ¶94. This shows that the receiving PVRs detect their role as participants (i.e., control-slaves) based on the broadcasted command and synchronize playback accordingly. Decl., ¶94.

e. [1cii] "and (b) one of an audio-master mode or an audio-slave mode for the synchrony group;"

Janevski teaches [1cii] by describing synchronized playback of aural content across PVRs (synchrony group). Janevski, 5:10-12; 16:36-37; Decl., ¶95. Janevski's "renderable content" "refers to content that is presentable in a form that a user can sense, e.g. visually or aurally." Janevski, 5:10-12; Decl., ¶95. Janevski discloses synchronizing playback of "two or more digital bit streams," and "the presentation may be merely visual or merely aural or both visual and aural." Janevski, 16:36-37; Decl., ¶95. This confirms that Janevski's PVR synchronized viewing system supports synchronized audio playback, and that each PVR may be involved in presenting aural content. Decl., ¶95.

As explained in [1ci], Janevski discloses that initiator PVR (e.g., 114a) controls synchronization and presenting content in aural form, thereby operating in an audio-master mode. Janevski, 5:10-12; 6:1-22; 16:36-37; Decl., ¶96. "[T]he initiator performs the same process to synchronize each participant." Janevski, 8:42–48; Decl., ¶96. The participant PVRs (e.g., 114b) receive synchronization commands and adjust accordingly, operating in an audio-slave mode through aural presentation. Janevski, 8:48-52; Decl., ¶96. Janevski discloses that "the characteristic information may be characteristic of viewable images or of audible sounds," confirming that synchronization applies to audio content. Janevski, 16:38–41; Decl., ¶96.

To enable synchronized playback, Janevski describes a time synchronization between the initiator and the participants, disclosing that "[t]ime synchronization is performed by the initiator PVR 114a individually with each participant PVR 114b, and involves sending an originating synchronization message … and sending a reply synchronization message …. Differences between the respective transmission times are resolved by… 'fine tune' aligning based on content of respective digital bit streams." Janevski, 8:65-9:14; Decl., ¶97. This shows that the initiator PVR detects its role as the **audio-master** by initiating synchronization and distributing audio and timing information. Decl., ¶97. The participant PVRs detect their role as **audio-slaves** by responding to synchronization messages and aligning playback and timing accordingly. *Id.*

Thus, Janevski teaches that each PVR detects whether it is operating in an audio-master or audio-slave mode based on its role in synchronizing playback of aural content. Decl., ¶98.

f. [1d] "beginning to operate in the synchrony group in accordance with the indication;"

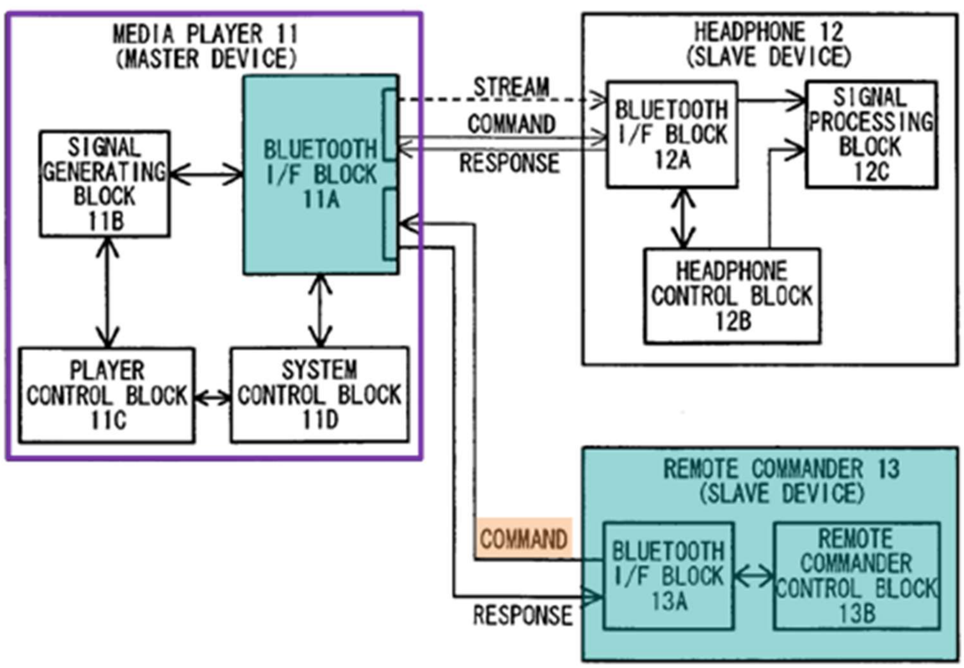
Janevski teaches [1d] by disclosing that "[e]ach time that a participant changes the watching mode i.e. executes a control function (rewind, fast forward, etc.), that participant broadcasts a command to all other participants (including the 'current' initiator) and thereby becomes the new initiator." Janevski, 8:48–52; Decl., ¶99. Following this role change, Janevski discloses that "the initiator performs the same process to synchronize each participant, whereby all participants become synchronized" (synchrony group). Janevski, 8:42–47; Decl., ¶99. This includes PVRs broadcasting status messages and commands to the other PVRs to maintain synchronization in their respective roles. Janevski, 7:25-50; Decl., ¶99. Therefore, Janevski confirms that the zone player begins operating in the synchrony group in accordance with the detected indication—whether as initiator or participant—by initiating or responding to synchronization commands. Decl., ¶99.

g. [1e] "wherein, while operating in the control-master mode for the synchrony group, the first zone player is configured to: receive, via the network interface, first control information for the synchrony group from a network device that is communicatively coupled to the first zone player; and"

The combination of Janevski and Kawamura renders obvious limitation [1e]. Decl., ¶100. First, Janevski teaches most of [1e] by disclosing that a "remote control 116a, b is commonly associated with the personal video recorder 114a, b to allow the user to operate the personal video recorder 114a, b remotely." Janevski, 6:39–41; Decl., ¶100. While operating in control-master mode, the initiator receives this control input and uses it to direct synchronization: "Each time that a participant changes the watching mode i.e. executes a control function (rewind, fast forward, etc.), that participant broadcasts a command to all other participants." Janevski, 8:42–52; Decl., ¶100. A control input for executing a control function is the claimed *first control information.* Decl., ¶100. Janevski's PVR synchronized viewing system includes "an Internet network 118 that interconnects the PVRs 114a, b … such that synchronization may be achieved," (synchrony group) confirming that the control information is received and transmitted via a network interface. Janevski, 6:44–49; Decl., ¶100.

As discussed above in element 1a, Kawamura teaches that it was also known to receive commands from a "remote commander" (e.g., a network device) via a "Bluetooth interface" (via the network interface). Kawamura, [0088]-[0090]; Decl., ¶101.

F I G. 2



Kawamura, FIG. 2.

Janevski at least suggests receiving the playback commands from a network device via a network interface because Janevski discloses a "remote control 116a, b to allow the user to operate the personal video recorder 114a, b remotely." Janevski, 6:39-44; Decl., ¶102. The "remote control" is a network device *communicatively coupled* with the PVR, as shown in Figure 1. Decl., ¶102.

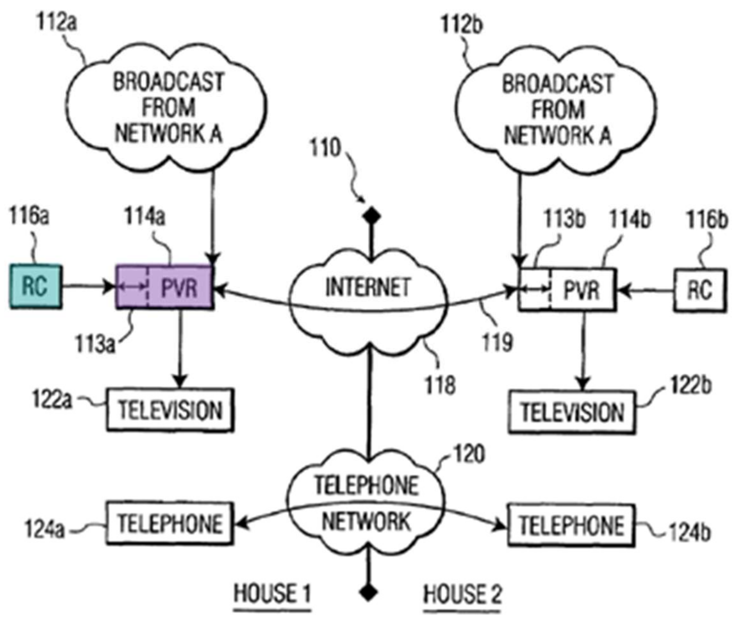


FIG. 1

Janevski, FIG. 1.

As described in element 1a, Janevski's exemplary embodiment includes "a remote control sensor 204. Janevski, 7:51-8:1; Decl., ¶103. While Janevski contemplates that its "remote control" is "typically" "configured to transmit an infrared signal to the television 122a, b," a POSITA would have understood other wireless communication techniques were compatible with and advantageous for Janevski. Janevski, 6:40-44; Decl., ¶103.

As discussed above in element 1a, Kawamura discloses one known suitable option to replace infrared—Bluetooth. Decl., ¶104. And Kawamura's media player and remote commander each include a Bluetooth interface, which serves as a network interface for communicating commands and responses over the Bluetooth wireless network. Decl., ¶104; Kawamura, [0088], [0090]–[0091], [0100]–[0104]. Thus, Kawamura's "media player" (zone player) receives "commands" from the "remote commander" (network device) via the "Bluetooth interface." (network interface). *Id.*

As combined above and discussed in element 1a, Kawamura's "remote commander" would have served as Janevski's "remote control" and Janevski's "PVR 114a" would have received its "control function" via Kawamura's "Bluetooth interface." Decl., ¶105. This combination would have been obvious to a POSITA for the reasons discussed in element 1a. *Id.*

Janevski's "receiver" and Kawamura's "Bluetooth interface" meet the construction of "physical component of a device that provides an interconnection with a data network" because they are physical components that connect to the "Internet" and "Bluetooth" networks, respectively. Janevski, 7:57-63; 6:6-16; Kawamura, [0088]-[0091]; Decl., ¶106.

h. [1f] "based on the first control information, cause, via the network interface, at least one playback action to be applied in the synchrony group;"

Janevski teaches [1f] by disclosing "control function[s]," such as "stop, pause, fast forward, [and] reverse." Janevski, 6:18-22; Abstract; Decl., ¶107. Each of these "control function[s]" is a playback action because they control playback. *Id*. For example, "fast forwards" means "moves forward in the video 308 faster than the video moves in normal play." Janevski, 14:34-43; Decl., ¶107.

The "initiator" controls synchronous playback in response to the "control function," which is the claimed *first control information* as explained in element 1e, because "[t]he initiator directs all participants … ***upon execution of each control function*** … to synchronize their playbacks to that of the initiator, whereby all playbacks are synchronized and maintain[ed] in synchronization" (synchrony group). Janevski, Abstract (emphasis added); Decl., ¶108.

These playback actions are applied across the synchrony group via the network interface, as the initiator "broadcasts a command to all other participants." Janevski, 8:42–52; Decl., ¶¶109-110. Janevski also discloses *via the network interface*, by disclosing that "an Internet network 118 interconnects 114a, b, located at the two different locations…. [and] supplies the means 119 for communicating information between the PVRs 114a, b such that synchronization may be achieved." Janevski, 6:45-51; Decl., ¶¶109-110. As explained in [1a], the network interface referenced in the claim may encompass multiple interfaces. Ex. 1001, 4:14-21; 24:45-57; Decl., ¶¶109-110.

i. [1g] "wherein, while operating in the control-slave mode for the synchrony group, the first zone player is configured to: receive, via the network interface, second control information from another zone player; and"

Janevski teaches [1g] by disclosing that "[e]ach time that a participant changes the watching mode i.e. executes a control function (rewind, fast forward, etc.), that participant broadcasts a command to all other participants … and thereby becomes the new initiator." Janevski, 8:42–52; Decl., ¶111. As discussed above in element 1e, these control functions of Janevski teach the claimed control information. Decl., ¶111. In the elements above, the first zone player is the initiator (claimed *control-master*) that receives control functions from its remote and broadcasts them to the other PVRs and those control functions are the claimed *first control information*. However, once a PVR other than the first zone player becomes the initiator, then the first zone player operates as a participant (i.e., in control-slave mode) and receives these commands from the current initiator. Decl., ¶111.

Janevski also discloses sending and receiving those commands *via the network interface*, by disclosing that "an Internet network 118 interconnects 114a, b, located at the two different locations … [and] supplies the means 119 for communicating information between the PVRs 114a, b such that synchronization may be achieved." Janevski, 6:45-51; Decl., ¶112.

j. [1h] "perform one or more playback actions in accordance with the second control information;"

Janevski teaches [1h] by disclosing that "each time that a participant changes the watching mode i.e. executes a control function (rewind, fast forward, etc.) [(i.e., *second control information*)], that participant broadcasts a command to all other participants." Janevski, 8:42–52; Decl., ¶113. The broadcast command is the second control information as explained in [1g], Janevski also discloses that "that participant's PVR 114b broadcasts a command for that function that is immediately communicated and effected [(i.e., performed)] in the PVR 114b of each participant, to keep the presentation synchronized." Janevski, 11:31–36; Decl., ¶113. Therefore, Janevski discloses that the receiving PVRs apply playback actions, such as rewind or fast forward, in accordance with control information received from another zone player. Decl., ¶113.

k. [1i] "wherein, while operating in the audio-master mode for the synchrony group, the first zone player is configured to: obtain audio information that is representative of the audio content;"

Janevski teaches [1i] by disclosing that "PVR 114a" performs the "initiator" role for the "synchronized viewing session." Janevski, Abstract, 6:16–27, 8:39–52; *id.*, 6:4–38, 7:25–50, 11:12–42; Decl., ¶114. The "initiator" role reflects a master device that controls synchronous playback because "[t]he initiator directs all participants … to synchronize their playbacks to that of the initiator, whereby all playbacks are synchronized and maintain[ed] in synchronization." Janevski, Abstract. Specifically, "time synchronization is performed by the initiator PVR 114a individually with each participant 114b." Janevski, 6:16–27, 8:65–9:4, 15:32–33, 16:34–43; Decl., ¶114.

Janevski discloses synchronizing playback of audio information because it "applies generally to synchronizing presentation of renderable content of two or more digital bit streams" which "may be … aural." Janevski, 6:16–27, 16:34–43; Decl., ¶115. Thus, the initiator PVR that initiates synchronized playback of the audio is operating in audio-master mode. Decl., ¶115.

To control synchronization, "a status message is sent out periodically by the 'initiator'," i.e., the device operating in audio-master mode, "[t]o ensure that the PVRs 114a, b participating in a session remain synchronous." Janevski, 7:39–50; *id.*, 1:53–2:5; Decl., ¶116. "The status message includes" information to ensure synchronized playback like "the current mode of watching (e.g., normal play, fast forward, pause), an indication of the time into the program, and *information characteristic of content of a digital bit stream*." *Id.* (emphasis added). For example, Janevski discloses comparing "corresponding content or 'landmarks' of pairs of video playbacks to be synchronized." Janevski, 3:53-57; Decl., ¶116. Janevski discloses that "audio transform coefficients" "can be used to characterize the content of the bit streams." Janevski, 16:38-43; Decl., ¶116. A person of ordinary skill in the art would understand that, in order to synchronize playback, the system must identify which portion of the audio content is being played, and this identification can be accomplished using landmarks or any information that identifies the location of the content—which, for example, can be a piece of the content itself. Decl., ¶117.

A POSITA would have understood that "audio transform coefficients" are computed from frames of audio samples and are part of the compressed audio stream—*i.e.,* they are *obtained*. Janevski, 16:38-43; Decl., ¶117. The prior art explains that an "audio signal" is "transformed from the time domain … to another domain that facilitates analysis" and "[t]he transformation produces a set of amplitude coefficients of a variable other than time, typically frequency." Decl., ¶117; Lim, [0006]-[0008]. "The transform coefficients [are] derived from a frame." Decl., ¶117, Lim, [0006]-[0012]. Therefore, audio transform coefficients are audio information. Decl., ¶117.

This is consistent with the '001 patent, which explains that audio information can be less than the full content for playback, because, for example, "each frame compris[es] digital audio information for a predetermined period of time." Ex. 1001, 19:49-53; Decl., ¶117. Therefore, Janevski discloses obtaining audio information that is representative of the audio content by disclosing obtaining "information characteristic of content of a digital bit stream," which can include audio information to identify the location of the content for synchronization. Decl., ¶117; Janevski, 7:39-50; Ex. 1016.

l. [1j] "generate playback timing information associated with the obtained audio information that is indicative of at least one future time relative to a reference clock time that denotes a time at which at least the first and second zone players are to engage in synchronous playback of a corresponding portion of the obtained audio information; and"

The combination of Janevski, Kawamura, and Okamura renders obvious limitation [1j]. Decl., ¶118. As discussed above, Janevski discloses that "to achieve precise synchronization, the present invention compares corresponding content or 'landmarks' of pairs of video playbacks to be synchronized, determines video replay 'distance' between the landmark pairs, and slows down or speeds up selected playbacks in accordance with these distances." Janevski, 3:52–57; Decl., ¶118. This includes providing synchronization messages with *obtained audio information* in the form of an "information characteristic of content of a digital bit stream" identifying those landmarks. Janevski, 7:40-50; Decl., ¶118. Based on the disclosures of Okamura it also would have been obvious to a person of skill in the art to also include the claimed playback timing information associated with those landmarks (i.e., the obtained audio information) in place of the timing information used in Janevski. Decl., ¶118. Janevski already disclosed that the synchronization messages should include playback timing information. Decl., ¶119. It discloses that "time synchronization is performed by the initiator PVR 114a individually with each participant PVR 114b, and involves sending an originating synchronization message 402 from the initiator PVR 114a to a participant PVR 114b and sending a reply synchronization message 404 from the participant PVR 114b to the initiator PVR 114a." Janevski, FIG. 4, 8:39-10:2; Decl., ¶119. Janevski discloses that "each message is timestamped based on the internal video timer of the respective PVRs at the moment of sending or receiving." Janevski, 8:65–9:4; Decl., ¶119. Janevski's PVR synchronized viewing system collects four time points: "the message 402 is sent at a time A … arrives at the participant … at a time B … the participant sends back a reply … at a time C … received by initiator … at a time D." Janevski, 9:15-35. "The time misregistration (TM) is calculated." Janevski, 9:30-35; Decl., ¶119. Janevski explains, "once the TM value is calculated, the participant PVR adjusts its timer forward or backward by that amount to match the initiator's playback time." Janevski, 9:11–13; Decl. ¶119. The "differences between the respective transmission times are resolved by … 'fine tune' aligning based on content of respective digital bit streams of the initiator and the participant." Janevski, 9:10-14; Decl., ¶119. This method allows Janevski's PVR synchronized viewing system to determine whether the initiator or participant is ahead or behind, and by how much, based on the sign and magnitude of TM. Decl., ¶119.

But Janevski also discloses that "[t]ime synchronization can be implemented in many different known ways." Janevski, 8:53-54; Decl., ¶120. So, while Janevski does not disclose *future time relative to a reference clock time* as its exemplary timing solution, a POSITA would have been motivated to look to other known solutions. Decl., ¶120.

Okamura discloses another known way of performing time synchronization—one using playback timing information associated with the obtained audio information that is indicative of at least one future time relative to a reference clock time that denotes a time at which at least the first and second zone players are to engage in synchronous playback of a corresponding portion of the obtained audio information. Decl., ¶121. It would have been obvious to a POSITA to implement this known alternative. *Id*. Okamura improves reactive solutions like Janevski by disclosing by "generat[ing] a timestamp (abbreviated as 'syt'), one in every 8 sampling clocks (or 8 data blocks), on the basis of the time provided by the cycle timer... The timestamp specifies the reproduction time at the receiving side of an event sequence." Okamura, 1:42–56; Decl., ¶121. Like Janevski, Okamura also discloses that timing information is a packet with audio data. Okamura, 1:42–56; Decl., ¶121. Therefore, Okamura shows that the playback timing information is packaged (i.e., included in the same packet) with the audio data and is associated with the specific portions of the audio stream to enable synchronized playback. Decl., ¶121.

A POSITA would have recognized that, to achieve synchronous playback of audio content, it would be obvious to combine Janevski's synchronization framework with Okamura's teaching of transmitting audio data for playback along with associated timing information. Okamura, 1:42–56; Decl., ¶121. In such a combination, the "obtained audio information" would be the actual audio data to be played back, not merely characteristic information for synchronization. Decl., ¶121. This modification would allow the system to synchronize playback of the audio content itself, as required by the claim. *Id*.

A POSITA would have recognized that Janevski's and Okamura's alternative approaches of packaging playback timing information with audio data in the same packet were both known and suitable options for achieving synchronized playback. Decl., ¶122. It would have been obvious to implement either method, or a combination thereof, to coordinate playback timing across multiple devices in a synchrony group as permitted under the flexible obviousness standard articulated in *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007). Decl., ¶122.

Once Okamura's timing is used, it discloses how the system generates and uses that information to maintain synchronized playback. Decl., ¶123. The receiving node (slave) uses its own internal cycle timer as a local clock and initiates playback when the adjusted timestamp matches its current time. *Id*. Okamura discloses that the system includes "an offset setting section that sets an offset time for the receiving node relative to the transmitting node and adds the offset time to a time indicated by the timestamp..." and "a reproduction time control section that operates when the time of the timestamp added with the offset time coincides with a current time indicated by an internal cycle timer for controlling the data output section to effect synchronous reproduction." Okamura, 5:53–67; Decl., ¶123.

Okamura also accounts for transmission delay, disclosing that "on the transmitting side, the time of timestamp is set as the value of a reproduction time on the receiving side by estimating propagation delay." Okamura, 24:7–9; Decl., ¶124. Additionally, Okamura teaches that "[b]y adjusting the offset value on the receiving side, the time of reproducing the audio data supplied from each transmitting node can be shifted from the time of timestamp." Okamura, 24:9–12; Decl., ¶124.

These teachings align with the '001 patent's requirement to generate playback timing information indicative of a future time for synchronized playback. Ex. 1001, 2:49–67, 3:1–19, 24:45–25:57; Decl., ¶125. Okamura teaches that the transmitting node (e.g., the first zone player) generates a timestamp "on the basis of the time provided by the cycle timer" and associates it with specific portions of the audio stream. Okamura, 1:42–56; Decl., ¶125. The timestamp is transmitted along with the audio data and "specifies the reproduction time at the receiving side of an event sequence," enabling the receiving node (e.g., the second zone player) to initiate playback of the corresponding portion of the audio information at the designated future time. *Id*. Thus, Okamura discloses generating playback timing information that is both associated with the obtained audio information and indicative of a future time at which at least the first and second zone players engage in synchronous playback of that audio content. Decl., ¶125.

A POSITA would have been motivated to combine Janevski and Kawamura with Okamura to improve synchronization precision and scalability across networked playback devices. Decl., ¶126. Janevski relies on reactive synchronization using internal video timers and message exchanges to correct misalignment between devices. Janevski, 8:65–10:3; Decl., ¶126. However, this approach assumes symmetrical transmission delays and lacks a predictive mechanism for future playback timing based on a shared reference clock. Decl., ¶126.

Okamura addresses these limitations by teaching a synchronization method that uses a cycle timer as a reference clock to generate timestamps representing future playback times and adjusts for propagation delay and clock offset. Okamura, 1:42–56, 5:53–67, 24:7–12; Decl., ¶¶127-129. In the context of the combination, Okamura's cycle timer corresponds to the reference clock maintained by Javnevski's initiator zone player. Decl., ¶¶127-129. A POSITA would have recognized that

Okamura's predictive synchronization mechanism would be advantageously implemented in Janevski's multi-device synchronization framework to improve timing accuracy and reduce reliance on reactive correction. *Id*.

Moreover, both references are directed to synchronizing playback across AV devices in networked environments and use similar components to achieve similar goals. Janevski, 6:4–44; Okamura, 1:42–56, 5:53–67; Decl., ¶130. A POSITA would have reasonably expected success in combining Okamura's reference-clock-based timestamping with Janevski's multi-device synchronization framework to achieve more robust and scalable synchronous playback. Decl., ¶130.

Implementing Okamura's timestamp generation in Janevski's multi-device synchronization framework would have used known techniques (reference clocks and offset adjustments) according to their known functions (predictive synchronization), to achieve predictable results (accurate future playback timing across devices). Decl., ¶131.

m. [1k] "transmit, via the network interface, the obtained audio information and the generated playback timing information to the second zone player; and"

The combination of Janevski, Kawamura, and Okamura renders obvious limitation [1k]. First, Janevski discloses that "the Internet 118 supplies the means 119 for communicating information between the PVRs 114a, b such that synchronization may be achieved." Janevski, FIG. 1, 6:44–49; Decl., ¶132.

Accordingly, messages sent in Janevski are sent “via the network interface” used to communicate over the Internet, as discussed above. Janevski, 6:45-51; Decl., ¶132. To control synchronization, “a status message is sent out periodically by the ‘initiator’, i.e., the PVR 114a” “[t]o ensure that the PVRs 114a, b participating in a session remain synchronous.” Janevski, 1:53-2:5, 7:39-50; Decl., ¶132. “The status message includes” information to ensure synchronized playback like “the current mode of watching (e.g., normal play, fast forward, pause), an indication of the time into the program, and information characteristic of content of a digital bit stream [(obtained audio information)].” Janevski, 7:39-50; Decl., ¶132. To the extent audio information means the full content for playback, it would have been obvious to modify Janevski’s “initiator” “PVR” “114a” to transmit the “broadcast” to the “participant” “PVR” “114b” if it did not already have the broadcast recorded. Janevski, 6:13-38; 6:45-51, 6:59-7:3; Decl., ¶133.

However, while Janevski teaches transmission of synchronization messages and audio content with timing information, Janevski does not disclose transmitting playback timing information indicative of a future time relative to a reference clock as taught in the ’001 patent. Decl., ¶134. But that specific type of timing information is disclosed by Okamura and would have been obvious to replace the timing information of Janevski. *Id*.

Okamura offers a known improvement over reactive solutions by teaching transmission of *the generated* playback timing information based on a reference clock as taught in the ’001 patent. Decl., ¶135. Okamura explains that the transmitting node “generates a timestamp (abbreviated as ‘syt’) … on the basis of the time provided by the cycle timer,” and that “the timestamp specifies the reproduction time at the receiving side of an event sequence.” Okamura, 1:42–56; Decl., ¶135. This timestamp is transmitted along with the audio data previously obtained by the transmitting node (e.g., the first zone player), as explained for 1[i], to the receiving node, which uses it to determine when playback should occur. *Id*.

Okamura discloses that “on the transmitting side, the time of timestamp is set as the value of a reproduction time on the receiving side by estimating propagation delay.” Okamura, 24:7–12; Decl., ¶136. This confirms that the playback timing information is generated and transmitted in advance, allowing the receiving node to synchronize playback at a future time. Decl., ¶136. Additionally, Okamura teaches that “by adjusting the offset value on the receiving side, the time of reproducing the audio data supplied from each transmitting node can be shifted from the time of timestamp.” Okamura, 24:7–12; Decl., ¶136. This demonstrates that the transmitted timing information is used to control playback timing at the receiving node. Decl., ¶136.

Thus, Okamura teaches transmitting both the obtained audio information as explained for 1[i] and the generated playback timing information via a network interface to a second zone player, satisfying the requirements of [1k]. Decl., ¶137.

n. [1l] "wherein, while operating in the audio-slave mode for the synchrony group, the first zone player is configured to: receive, via the network interface, audio information and playback timing information associated with the received audio information from another zone player; and"

The combination of Janevski, Kawamura, and Okamura renders obvious limitation [1l]. Decl., ¶138. First, Janevski teaches element [1l] by disclosing that "the Internet 118 supplies the means 119 for communicating information between the PVRs 114a, b such that synchronization may be achieved." Janevski, 6:44–51; Decl., ¶138. Accordingly, messages sent in Janevski are sent "via the network interface" used to communicate over the Internet, as discussed above. *Id*. The initiator transmits a **status message** to each participant to maintain synchronization. *Id*. Janevski discloses that the synchronization process includes the transmission of a status message "to ensure that the PVRs 114a, b participating in a session remain synchronous" (synchrony group). Janevski, 7:39–50; Decl., ¶138. This confirms that the participant PVRs (e.g., the first zone player in audio-slave mode) receives synchronization-related information via a network interface from another zone player (e.g., the initiator). Decl., ¶138.

Janevski discloses that its status message contains "the current mode of watching (e.g., normal play, fast forward, pause), an indication of the time into the program, and information characteristic of content of a digital bit stream" and discloses that the content "may be aural" (audio information). Janevski, 5:10–12, 7:39-50, 16:36–37; Decl., ¶139.

While Janevski discloses "an indication of the time into the program," Janevski does not teach playback timing information as taught by the '001 patent. Decl., ¶140. So, while Janevski does not expressly disclose *playback timing information* as its exemplary timing solution, a POSITA would have been motivated to look to other known solutions, like Okamura. *Id*.

Okamura discloses that using playback timing information associated with the obtained audio information that is indicative of at least one future time relative to a reference clock time that denotes a time at which at least the first and second zone players are to engage in synchronous playback of a corresponding portion of the obtained audio information was another known solution that would have been obvious to a POSITA to implement. Decl., ¶141.

Okamura offers a known improvement over reactive solutions by disclosing that "the timestamp specifies the reproduction time at the receiving side of an event sequence," and that it is generated "on the basis of the time provided by the cycle timer." Okamura, 1:42-56; Decl., ¶142. This timestamp is transmitted along with the audio data and is used by the receiving node to determine when playback should occur. *Id*. Okamura discloses that "by adjusting the offset value on the receiving side, the time of reproducing the audio data supplied from each transmitting node can be shifted from the time of timestamp." Okamura, 24:7-12; Decl., ¶142. This demonstrates the playback timing information as taught in the '001 patent. Decl. ¶¶142–144.

Janevski's "indication of the time into the program" would have been easily modified to include Okamura's *playback timing information indicative of a future time relative to a reference clock*. Decl., ¶145. In short, Janevski discloses receiving information related to playback timing; Okamura defines the specific content of the playback timing information received. *Id*.

o. [1m] "engage in synchronous playback of the received audio information with at least the second zone player based on the received playback timing information associated with the received audio information while a local clock time of the first zone player differs from a local clock time of the second zone player."

The combination of Janevski, Kawamura, and Okamura renders obvious limitation [1m]. Decl., ¶146. Janevski teaches engaging in synchronous playback of audio information between zone players. *Id*. Specifically, Janevski discloses that "the initiator directs all participants … to synchronize their playbacks to that of the initiator, whereby all playbacks are synchronized and maintain in synchronization."

Janevski, 7:39–50; Decl., ¶146. The synchronization process includes transmission of a status message containing "an indication of the time into the program, and information characteristic of content of a digital bit stream." *Id*. Because Janevski defines "renderable content" as "content that is presentable in a form that a user can sense, e.g. visually or aurally," and confirms that "the presentation may be merely visual or merely aural or both visual and aural," this necessarily includes audio information. Janevski, 5:10–12, 16:36–37; Decl., ¶146. However, Janevski does not disclose that the zone players operate with different local clock times or how synchronization is achieved in such a scenario. Decl., ¶146.

So, while Janevski does not disclose *local clock time* as its exemplary timing solution, a POSITA would have been motivated to look to other known solutions. *Id*.

Okamura discloses that local clocks for the transmitting and receiving node was another known solution that would have been obvious to a POSITA to implement. Decl., ¶147. Okamura offers a known improvement by explicitly teaching synchronization across devices with differing local clocks. *Id*. In Okamura's architecture, the transmitting and receiving nodes operate on different clocks. *Id*. The transmitting node functions as the master, generating timestamps based on a cycle timer, which serves as the system's reference clock. *Id*. Specifically, Okamura discloses that "each of the transmitting nodes… generates a timestamp (abbreviated as 'syt'), one in every 8 sampling clocks (or 8 data blocks), on the basis of the time provided by the cycle timer." Okamura, 1:42–56; Decl., ¶147. Okamura's receiving node acts as the slave, using its own internal cycle timer as a local clock to determine when to play back the audio data. Decl., ¶147. Okamura describes "a reproduction time control section that operates when the time of the timestamp added with the offset time coincides with a current time indicated by an internal cycle timer for controlling the data output section to effect synchronous reproduction." Okamura, 5:53-67; Decl., ¶147. These disclosures confirm that Okamura's transmitting and receiving nodes operate on separate clocks with one serving as the reference and the other as the local playback clock. Decl., ¶147. Playback is initiated when "the time of the timestamp added with the offset time coincides with a current time indicated by an internal cycle timer." *Id.*; Okamura, 5:53-67. Okamura discloses that "by adjusting the offset value on the receiving side, the time of reproducing the audio data supplied from each transmitting node can be shifted from the time of timestamp," allowing synchronization even when local clocks differ. Okamura, 24:7-12; Decl., ¶147.

As described in [11], the first zone player (in audio-slave mode) receives, via the network interface, both the audio information and the playback timing information from another zone player. Decl., ¶148. The playback timing information is associated with the received audio information, as Okamura teaches "each transmitting node… arranges audio data of one or more channels into a data field and arranges the associated timestamp into a syt field so as to form a packet composed of the data field and the syt field." Okamura, 1:42–56; Decl., ¶148. This confirms that the audio and timing information are received together and used to initiate playback at a future time. Decl., ¶148.

Thus, Okamura teaches engaging in synchronous playback based on received timing information while local clock times differ, satisfying the remainder of [1m]. Decl., ¶149.

A POSITA would have been motivated to combine Janevski and Okamura to enable more robust and accurate synchronization across zone players with differing internal clocks. Decl., ¶150. Janevski provides a framework for synchronized playback between devices but assumes that timing differences can be corrected reactively using symmetrical message exchanges and internal video timers. *Id*. This approach does not account for persistent clock drift, asynchronous local timers, network delays, or playback glitches which can degrade synchronization quality over time. *Id*.

Okamura addresses this limitation by introducing a reference clock (cycle timer) and offset-based synchronization, allowing devices with different local clocks to align playback precisely. Decl., ¶151-152. A POSITA would have recognized that Okamura's predictive synchronization mechanism would be advantageously implemented in Janevski to improve timing accuracy and reduce reliance on reactive correction. *Id*.

Both references are directed to synchronizing playback across AV devices in networked environments and use similar components, e.g., media players, control messages, and timing mechanisms, to achieve similar goals. Janevski, 6:4–44; Okamura, 1:42–56, 5:53–67; Decl., ¶153. A POSITA would have reasonably expected success in combining Okamura's reference-clock-based synchronization with Janevski's multi-device playback framework to achieve predictable and scalable results. *Id*.

2. Claims 12 and 23

Independent claims 12 and 23 are unpatentable for the same reasons as claim 1 because they simply repeat the elements of claim 1 and one additional unpatentable element. Decl., ¶154. The table below highlights the language in claims 12 and 23 that is copied from or substantively identical to claim 1. *Id*.

Elements of claim 1	Elements of claims 12 and 23
[1a]	a network interface that is configured to communicatively couple the first zone player to at least one data network; receiving, via a network interface at the first zone player, a request to engage in synchronous playback of audio content as part of a synchrony group that includes at least a second zone player that is communicatively coupled to the first zone player via at least one data network;

[1b]	after receiving the request to enter into the synchrony group:
[1ci]-[1cii]	detecting an indication that the first zone player is to operate in (a) one of a control-master mode or a control-slave mode for the synchrony group and (b) one of an audio-master mode or an audio-slave mode for the synchrony group; and
[1d]	beginning to operate in the synchrony group in accordance with the indication;
[1e]	wherein, while operating in the control-master mode for the synchrony group, the first zone player is configured to: receive, via the network interface, first control information for the synchrony group from a network device that is communicatively coupled to the first zone player; and
[1f]	based on the first control information, cause, via the network interface, at least one playback action to be applied in the synchrony group;
[1g]	wherein, while operating in the control-slave mode for the synchrony group, the first zone player is configured to: receive, via the network interface, second control information from another zone player; and
[1h]	perform one or more playback actions in accordance with the second control information;
[1i]	wherein, while operating in the audio-master mode for the synchrony group, the first zone player is configured to: obtain audio information that is representative of the audio content;
[1j]	generate playback timing information associated with the obtained audio information that is indicative of at least one future time relative to a reference clock time that denotes a time at which at least the first and second zone players are to engage in synchronous playback of a corresponding portion of the obtained audio information; and

[1k]	transmit, via the network interface, the obtained audio information and the generated playback timing information to the second zone player; and
[1l]	wherein, while operating in the audio-slave mode for the synchrony group, the first zone player is configured to: receive, via the network interface, audio information and playback timing information associated with the received audio information from another zone player; and
[1m]	engage in synchronous playback of the received audio information with at least the second zone player based on the received playback timing information associated with the received audio information while a local clock time of the first zone player differs from a local clock time of the second zone player.

Claims 12 and 23 only differ from claim 1 in their preambles and because claim 12 recites elements directed to a non-tangible computer readable medium having instructions encoded therein. Decl., ¶155. The preamble of claim 12, "[a] first zone player comprising" recites the same "zone player" of element [1a] and is disclosed for the same reasons. *Supra* Ground 1, [1a].

Claim 12 recites "at least one processor; a tangible, non-transitory computer-readable medium; and program instructions stored on the tangible, non-transitory computer-readable medium that are executable by the at least one processor such that the first zone player is configured to perform functions comprising:." Decl., ¶156. Janevski discloses "a processor … in either the PVRs 114a, b or one of the other devices associated with system 110." Janevski, 7:20-24; Decl., ¶156. Janevski also discloses these limitations because "PVR 114a includes … a digital memory 206," which is a non-transitory computer-readable media, as shown in Figure 2. Janevski, 7:57-8:7; Decl., ¶156. Janevski discloses that its memory includes instructions that are executed because "[a] memory device and a processor preferably reside in either the PVRs 114a, b" and "programming code associated with the system 110 preferably resides in the memory device and is processed by the processor." Janevski, 7:20-24; Decl., ¶156.

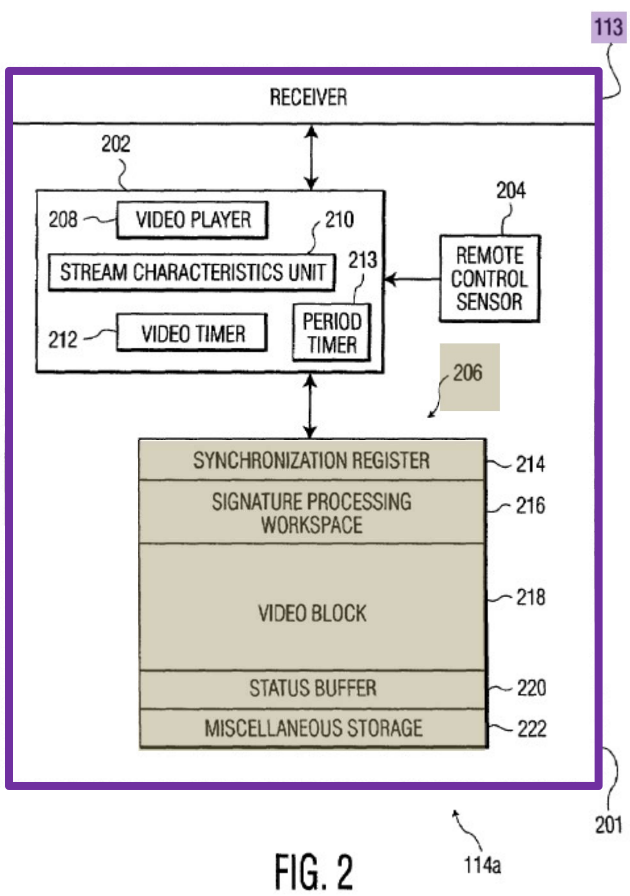


FIG. 2

Janevski, FIG. 2.

Claim 23 only differs from claim 1 and includes an element from claim 12 in its preamble because the "[t]angible, non-transitory computer-readable media having instructions stored therein, wherein the instructions, when executed, cause a first zone player to perform functions comprising:" are recited in claim 12's elements as discussed above. Decl., ¶157.

E. Dependent Claims

Dependent claims 13, 17-22, 24, and 28-33 are rendered obvious by the combination of Janevski, Kawamura, and Okamura. Decl., ¶158.

1. Claims 2, 13, and 24: "wherein detecting an indication that the first zone player is to operate in (a) one of a control-master mode or a control-slave mode for the synchrony group and (b) one of an audio-master mode or an audio-slave mode for the synchrony group comprises detecting an indication that the first zone player is to operate in (a) the control-master mode for the synchrony group and (b) the audio-master mode for the synchrony group."

Janevski teaches the additional elements of claims 2, 13, and 24 because it discloses that when a PVR "performs a control function (e.g., start, pause, rewind, fast forward)," that PVR "broadcasts a command to all participants … and … becomes the new initiator." Janevski, 7:31–50; 8:48–52; Decl., ¶159. This execution of a control function serves as the indication that the zone player is to operate in the control-master mode, as it triggers the role transition and initiates synchronization across the group. Decl., ¶159.

Janevski also teaches that the same indication reflects operation in the audio-master mode. Decl., ¶160. Specifically, Janevski discloses that "the status message [also] includes … an indication of the time into the program, and information characteristic of content of a digital bit stream from which playback to the message sender is being generated." Janevski, 7:36–41; Decl., ¶160. Janevski also discloses "synchronizing presentation of renderable content of two or more digital bit streams" which "may be … aural." Janevski, 6:16–27, 16:34–43; Decl., ¶160. Because Janevski defines "renderable content" as "content that is presentable in a form that a user can sense, e.g. visually or aurally," and confirms that "the presentation may be merely visual or merely aural or both visual and aural," this necessarily includes audio information. Janevski, 5:10–12, 16:36–37; Decl., ¶160. The fact that the initiator is generating playback from a digital bit stream and transmitting timing and content information to other zone players confirms that it is functioning as the audio-master. Decl., ¶160. Thus, Janevski teaches that the execution of a control function, and the resulting transmission of a status message, together serve as the detected indication that the zone player is to operate in both control-master and audio-master modes. *Id*.

2. Claims 6, 17, and 28: "wherein beginning to operate in the synchrony group in accordance with the indication comprises either (a) transitioning from operating in the audio-master mode to operating in the audio-slave mode or (b) transitioning from operating in the audio-slave mode to operating in the audio-master mode."

Janevski teaches the additional elements of claims 6, 17, and 28 because it discloses that that "each time that a participant changes the watching mode i.e. executes a control function (rewind, fast forward, etc.), that participant broadcasts a command to all other participants (including the 'current' initiator) and thereby becomes the new initiator." Janevski, 8:42–52; Decl., ¶161. This transition reflects a change from audio-slave mode to audio-master mode, as the participant assumes control over synchronized playback. Decl., ¶161.

Conversely, Janevski discloses that "the initiator directs all participants … to synchronize their playbacks to that of the initiator," and that the synchronization process includes the transmission of a status message which includes "information characteristic of content of a digital bit stream from which playback to the message sender is being generated." Janevski, 7:39–50; Decl., ¶162. Because the initiator is the source of playback timing and content, it operates in audio-master mode, and participants operate in audio-slave mode. Decl., ¶162. Thus, Janevski teaches that beginning to operate in the synchrony group includes transitioning between audio-master and audio-slave modes, satisfying the requirements of Claims 6, 17, and 28. *Id*.

3. Claims 7, 18 and 29: "wherein the first control information identifies particular audio content to be played back by the synchrony group that is available at an audio source outside of the at least one data network, and wherein causing the at least one playback action to be applied in the synchrony group comprises causing a zone player operating in the audio-master mode to obtain audio information that is representative of the particular audio content."

Janevski teaches the additional claims 7, 18, and 29. Decl., ¶163.

Figure 1 illustrates the "synchronized viewing session," where "[t]he Internet 118 [the claimed *data network*] supplies the means 119 for communicating information between the PVRs 114a, b such that synchronization may be achieved." Janevski, 6:48-51; Decl., ¶164.

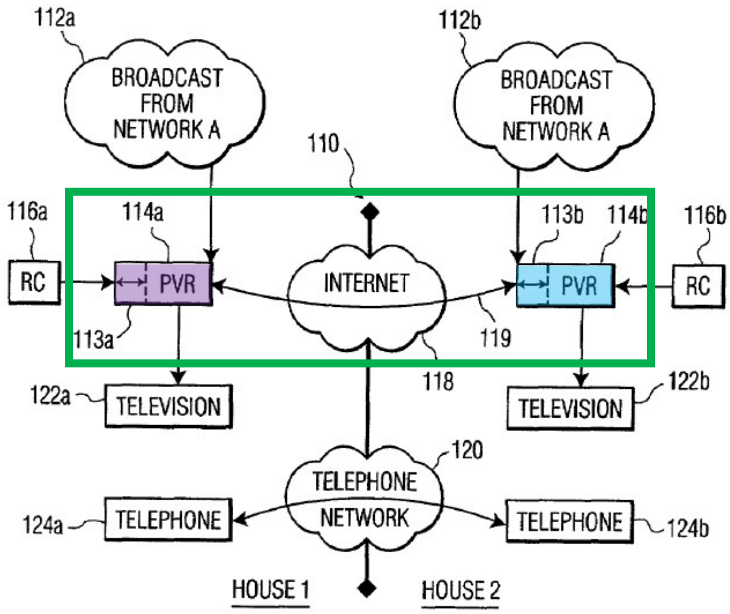


FIG. 1

Janevski, FIG. 1.

FIG. 1 also discloses that "broadcasts **112***a, b* of a television program from network A is made pursuant to any communication means known to one having ordinary skill in the art, such as cable, digital cable, satellite, antenna, over the Internet or combinations thereof." Janevski, FIG. 1, 6:6-10; Decl., ¶165. Since network A (112a) is outside the at least one data network (the Internet 118), Janevski teaches that particular audio content to be played back by the synchrony group can be available at an audio source outside of the data network used for synchronization. *Id*. Specifically, broadcasts from network A – including cable, digital cable, satellite, antenna, or other sources – are external to the Internet-based data network that supplies synchronization information between the PVRs. Janevski, 6:6-39, 6:48-51; FIG. 1; Decl., ¶165.

Thus, the first control information in Janevski's system can identify particular audio content, e.g., a television broadcast or audio stream, available from network A, which is outside the Internet data network used for device-to-device communication and synchronization. Janevski, 6:6-39, FIG. 1; Decl., ¶166.

Thus, Janevski teaches that the zone player can obtain and play back audio information from an external source, network A (112a), satisfying the requirements of claims 7, 18, and 29. Decl., ¶167.

4. Claims 8, 19, and 30: "wherein the at least one future time relative to the reference clock time comprise at least one first future time that is determined based on a local clock of a zone player other than the first zone player."

The combination of Janevski and Okamura teaches the additional elements of claims 8, 19, and 30 because it discloses that the transmitting node "generates a timestamp (abbreviated as 'syt'), one in every 8 sampling clocks (or 8 data blocks), on the basis of the time provided by the cycle timer... The timestamp specifies the reproduction time at the receiving side of an event sequence." Okamura, 1:42–56; Decl., ¶168. The "cycle timer" serves as the system's reference clock. Ex. 1001, 2:49–67; Decl., ¶168.

The receiving node (the second zone player) uses its own internal cycle timer, i.e., a local clock, to determine when to initiate playback. Decl., ¶169. Okamura discloses "a reproduction time control section that operates when the time of the timestamp added with the offset time coincides with a current time indicated by an internal cycle timer." Okamura, 5:53–67; Decl., ¶169. This confirms that the playback time is determined based on the local clock of the receiving node, which is a zone player other than the first. Decl., ¶169.

Okamura explains that "by adjusting the offset value on the receiving side, the time of reproducing the audio data supplied from each transmitting node can be shifted from the time of timestamp." Okamura, 24:7–12; Decl., ¶170. This adjustment is based on the receiving node's local clock and ensures synchronized playback. Decl., ¶170. Thus, Okamura teaches that the future time for playback, relative to the reference clock, is determined based on the local clock of another zone player, satisfying Claims 8, 19, and 30. *Id.*

5. Claims 9, 20 and 31: "wherein the at least one future time relative to the reference clock time comprise at least one first future time that is determined based on a local clock of the first zone player."

Okamura teaches the additional elements of claims 9, 20, and 31 because it discloses that the transmitting node "generates a timestamp (abbreviated as 'syt') … on the basis of the time provided by the cycle timer." Okamura, 1:42–56; Decl.,

¶171. The "cycle timer" serves as the system's reference clock. The timestamp "specifies the reproduction time at the receiving side of an event sequence." *Id*.

Okamura discloses "an offset setting section that sets an offset time for the receiving node relative to the transmitting node and adds the offset time to a time indicated by the timestamp." Okamura, 5:53–67; Decl., ¶172. The receiving node uses its own internal cycle timer, i.e., its local clock, to determine when playback should occur, because in this context, the first zone player is operating in audio-slave mode, and the future playback time is determined based on its own local clock. Decl., ¶172. Okamura describes "a reproduction time control section that operates when the time of the timestamp added with the offset time coincides with a current time indicated by an internal cycle timer." Okamura, 5:53–67; Decl., ¶172.

Thus, opposite to claims 8, 19, and 30 where the first zone player is the transmitting node, here in claims 9, 20, and 31, the future time for playback is determined based on the local clock of the receiving node, which in this case corresponds to the first zone player operating in audio-slave mode. Decl., ¶173. Okamura confirms that "by adjusting the offset value on the receiving side, the time of reproducing the audio data supplied from each transmitting node can be shifted from the time of timestamp." *id.*; Okamura, 24:7–12. This adjustment is based on the local clock of the receiving zone player, satisfying the requirements of Claims 9, 20, and 31. Decl., ¶173.

6. Claims 10, 21, and 32: "wherein the second control information comprises information indicative of a volume adjustment, and wherein performing one or more playback actions in accordance with the second control information comprises adjusting a playback volume of the first zone player."

The combination of Janevski, Kawamura, and Okamura renders obvious the additional claims 10, 21, and 32. Decl., ¶174. Janevski teaches control functions such as "start, pause, rewind, fast forward," and synchronization of playback across devices, but does not disclose volume adjustment. *Id.*; Janevski, 6:18–22; 8:42–52.

Okamura mentions volume only in the context of preset playback conditions by disclosing that "in step S81, the audio data are reproduced and outputted to the reproduction channels (audio0 through audio7) under conditions such as volume, effect, etc. preset to these channels." Okamura, 21:1-13; Decl., ¶175. However, Okamura also does not disclose *information indicative of a volume adjustment* nor *adjusting a playback volume of the first zone player*. Decl., ¶175.

Kawamura teaches volume adjustment as another playback function. Kawamura discloses that "the remote commander 13 remotely controls the media player 11 for executing play control such as play, stop, pause, fast forward and rewind and remotely controls the headphone 12 for executing sound volume adjustment (volume up/down) for example." Kawamura, [0088]; Decl., ¶176. The headphone control block 12B realizes sound output functions such as volume up, volume down, and mute. Kawamura, [0097]; Decl., ¶176. The remote commander issues volume adjustment commands, which are transferred by the media player to the headphone for execution. Kawamura, [0118]; Decl., ¶176.

A POSITA would have recognized that volume adjustment is a standard playback function, just like play, pause, or fast forward, and that Bluetooth protocols as discussed in Kawamura support transmission of all such playback commands, including volume adjustment, between devices. Decl., ¶¶177-178. A POSITA would have been motivated to combine Kawamura's volume adjustment playback function in addition to Janevski and Okamura's playback functions to implement a standard set of playback commands (including volume) in a synchronized playback system, using Bluetooth or similar protocols to transmit all relevant commands as needed. *Id*.

Thus, the combination of Janevski, Kawamura, and Okamura would have used known techniques (volume control via remote input) in known systems (multi-device synchronized playback), to achieve predictable results (volume adjustment during synchronized playback). *Id*. A POSITA would have reasonably expected success in combining Kawamura's volume control mechanism with Janevski and Okamura's synchronization framework to improve user experience and provide more granular playback control across devices. *Id*.

7. Claims 11, 22 and 33

a. 11, 22, and 33 (pre): "wherein the playback timing information that is received while operating in the audio-slave mode comprises at least one future time at which at least the first and second zone players are to engage in synchronous playback of a corresponding portion of the received audio information, and wherein operating in the audio-slave mode to engage in synchronous playback of the received audio information with at least the second zone player comprises:"

Janevski and Okamura render claim elements 11(pre), 22 (pre), and 33 (pre) obvious as explained in [1j], [1l], [1m], and as explained for dependent claims 8, 19, and 30 and 9, 20, and 31. Decl., ¶179.

b. 11, 22, and 33 (a): "updating the at least one future time to account for a differential between the local clock time of the first zone player and a local clock time of another zone player; and"

Janevski and Okamura teach claim elements 11(a), 22 (a), and 33 (a), because Okamura discloses that there is "an offset setting section that sets an offset time for the receiving node relative to the transmitting node and adds the offset time to a time indicated by the timestamp." Okamura, 5:53–67; Decl., ¶180. This offset time is used to adjust the received timestamp, which represents the future playback time, so that playback can be synchronized even when the local clocks of the zone players differ. Decl., ¶180. Therefore, Okamura teaches that the receiving node (first zone player) maintains its own local clock ("internal cycle timer") and receives timestamps generated by the transmitting node (another zone player) based on its local clock. *Id*. The receiving node updates the future playback time by applying an offset to the received timestamp, thereby accounting for the differential between the local clock time of the first zone player and the local clock time of another zone player. *Id*.

Okamura explains, "by adjusting the offset value on the receiving side, the time of reproducing the audio data supplied from each transmitting node can be shifted from the time of timestamp." Okamura, 24:7–12; Decl., ¶181. This adjustment ensures that the future time for synchronous playback is updated to account for the differential between the local clock time of the first zone player and the local clock time of another zone player, satisfying the requirements of claims 11(a), 22(a), and 33(a). Decl., ¶181.

c. 11, 22, and 33 (b): "when the local clock time of the first zone player reaches the updated at least one future time, engaging in synchronous playback of the corresponding portion of the received audio information with at least the second zone player."

Janevski and Okamura teach claim elements 11(b), 22 (b) and 33 (b), because Okamura discloses "a reproduction time control section that operates when the time of the timestamp added with the offset time coincides with a current time indicated by an internal cycle timer for controlling the data output section to effect synchronous reproduction." Okamura, 5:53–67; Decl., ¶182.

Okamura's "timestamp specifies the reproduction time at the receiving side of an event sequence." Okamura, 1:42–56; Decl., ¶183. Playback is initiated when "the time of the timestamp added with the offset time coincides with a current time indicated by an internal cycle timer," ensuring that synchronous playback occurs at the correct time. Okamura, 5:53–67; Decl., ¶183.

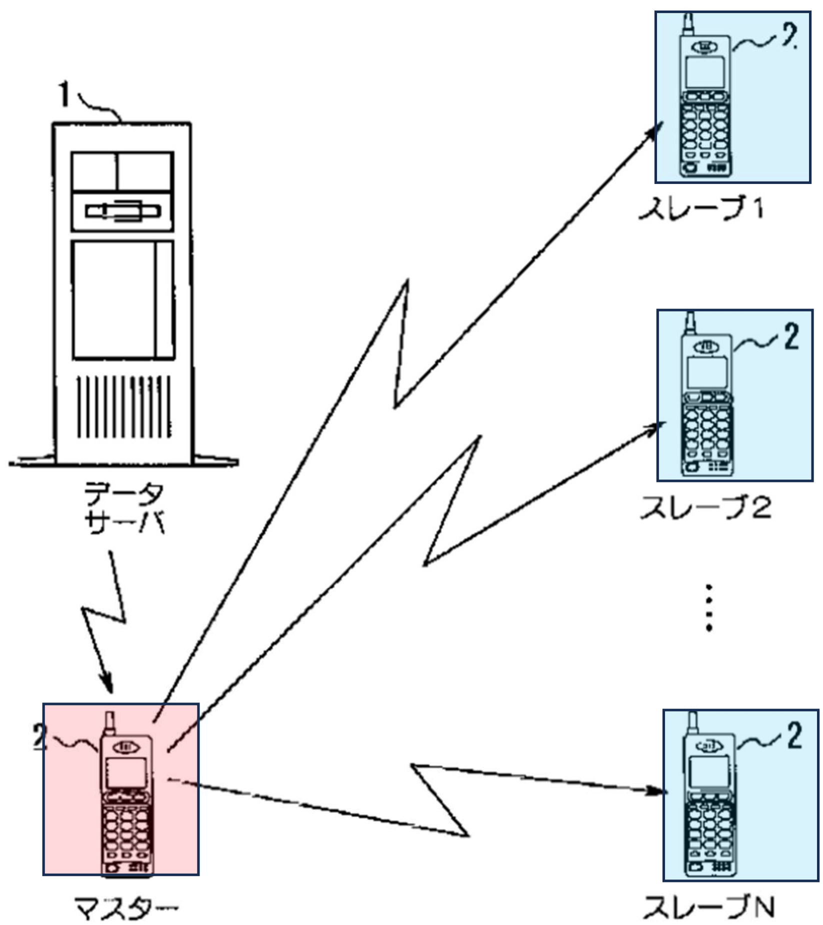
VII. Ground 2: Claims 3, 14, and 25 Are Rendered Obvious by Janevski, Kawamura, Okamura, and Kono.

A. Kono (Ex. 1008)

Kono's system includes a "master mobile terminal" and one or more "slave mobile phone devices," each equipped with a wireless communication module such as Bluetooth. Kono, [0011]; Decl., ¶¶184-185. The master uses the Internet to download a song. Kono, [0012]; Decl., ¶¶184-185. The downloaded song data is embedded with "timing information, which indicates a playback timing for a song." *Id*.

Playback is initiated when "[o]n the master side,…the playback start button is pressed," which causes "a start notification packet [to be] sent to the slave," and "playback of audio data, subtitle data, and image data is started." Kono, [0021]; Decl., ¶¶186-187. On the slave side, "when the aforementioned start notification packet is received … playback of audio data, subtitle data, and the image data is started." Kono, [0022]; Decl., ¶¶186-187.

【図1】



Kono, FIG. 1.

Kono is analogous art to the ’001 patent because it is directed to the same field: controlling synchronous audio playback across multiple devices. Compare Ex. 1001, 1:25–45, 2:35–48, 5:33–39, with Kono, [0001], [0005], [0011], [0012]; Decl., ¶188.

B. Claims 3, 14, and 25: "wherein the obtained audio information comprises a beginning of the obtained audio information, and wherein the playback timing further comprises a future time relative to the reference clock time that denotes a time at which at least the first and second zone players are to initiate synchronous playback at the beginning of the obtained audio information."

The combination of Janevski, Kawamura, and Okamura with Kono renders obvious claims 3, 14, and 25. Decl., ¶189-193. As discussed above in elements [1j]-[1m] of claim 1, Janevski teaches using timing information for playback synchronization of audio content across devices and Okamura explicitly teaches *a future time relative to the reference clock time*. *Id*. However, neither Janevski nor Okamura explicitly disclose *initiat[ing] synchronous playback at the beginning of the obtained audio information*. *Id*. Kono offers a known improvement by teaching that the master mobile terminal downloads song data from a server and initiates playback from the beginning. *Id*. Kono states, "first, the master accesses a site on the server 1 via the Internet, selects song data, and downloads the song data by a prescribed procedure." Kono, [0012]; Decl., ¶189-193.

Kono explains that when "[o]n the master side,… the playback start button is pressed," which causes "a start notification packet [to be] sent to the slaves," and "playback of audio data, subtitle data, and image data is started." Kono, [0021]; Decl., ¶194. On the slave side, "when the aforementioned start notification packet is received … playback of the audio data, subtitle data, and the image data is started."

Kono, [0022]. This confirms that playback is initiated at the beginning of the audio content. Decl., ¶194.

Kono is compatible with the Janevski and Okamura because it also teaches synchronization based on timing information embedded in the audio data. Kono, [0014]; Decl., ¶195. During playback, "the timing information for the song data on the master side is sent to each of the slaves via the wireless communication modules, and each of the slaves controls its own playback speed on the basis of that timing information." Kono, [0013]; Decl., ¶195. The slave checks "whether the timing at which the above-mentioned next block must be played back matches the timing indicated in the above-mentioned timing information that was received … [and] then playback of that block is started." Kono, [0022]; Decl., ¶195. This ensures that playback across devices is synchronized from the beginning of the audio stream. Decl., ¶195.

A POSITA would have been motivated to combine Kono with the Janevski–Okamura combination to implement a synchronized playback system that initiates playback at the beginning of the audio content. Decl., ¶196. Janevski teaches reactive synchronization using internal video timers and message exchanges to align playback timing across devices. Janevski, FIG. 4; 8:65–9:35; Decl., ¶196. Okamura improves upon this by introducing predictive synchronization using a reference clock and timestamp-based scheduling. Okamura, 1:42–56, 5:53–67; Decl., ¶196.

However, neither reference discloses initiating playback specifically at the beginning of the audio stream. Decl., ¶196.

Kono offers a known improvement by teaching that the master mobile terminal downloads song data from a server and initiates playback from the beginning of the audio content. Decl., ¶197. Kono discloses that "[f]irst, the master accesses a site on the server 1 via the Internet, selects song data, and downloads the song data by a prescribed procedure." Kono, [0012]; Decl., ¶197. Playback is initiated when "[o]n the master side,… the playback start button is pressed," which causes "a start notification packet [to be] sent to the slaves," and "playback of audio data, subtitle data, and image data is started." Kono, [0021]; Decl., ¶197. On the slave side, "when the aforementioned start notification packet is received … playback of the audio data, subtitle data, and the image data is started." Kono, [0022]; Decl., ¶197. Kono confirms that playback begins at the start of the obtained audio information and is synchronized across devices using timing information embedded in each block. Kono, [0021]; Decl., ¶197.

A POSITA would have recognized that combining Kono's initiation mechanism with the Janevski–Okamura synchronization framework would yield a more complete and predictable multi-device playback system. Decl., ¶198. The combination uses known techniques, such as start-of-stream playback, timestamp-based scheduling, and inter-device synchronization, according to their known functions to achieve predictable results: synchronized playback beginning at the start of the audio content. *Id*.

A POSITA would have reasonably expected success in combining Kono with the Janevski, Kawamura, and Okamura combination, because all three references operate in the domain of networked or distributed media playback and use compatible components such as timing controllers, synchronization messages, and playback coordination logic. Decl., ¶199.

VIII. *Sotera* Stipulation

The Petitioner stipulates that, if the Board institutes this IPR based on the grounds presented herein, Petitioner will not pursue in the related district court litigation any invalidity defense that was raised or reasonably could have been raised in this IPR. *Sotera Wireless, Inc. v. Masimo Corp.*, IPR2020-01019, Paper 12, 18 (PTAB Dec. 1, 2020) (precedential). If the PTAB denies institution or institutes and later vacates institution of either IPR proceeding, Google reserves the right to pursue in the parallel litigation any ground that was raised or reasonably could have been raised in that IPR.

IX. Discretionary Denial Would Be Inappropriate

The Board should reach the merits of this petition and should not exercise its discretion to deny based on 35 U.S.C. §325(d) because the Advanced Bionics factors favor institution. None of the references used in this Petition cited during prosecution of the ’001 patent. Thus, the same or substantially the same art or arguments were not previously presented to the Office. And, because the Office never considered the references or the specific combinations presented in the Petition, the Examiner materially erred by failing to consider and apply them.

Discretionary denial under 35 U.S.C. §314(a) is not appropriate because the *Fintiv* factors weigh in favor of institution and Patent Owner has no settled expectations. Petitioner includes a *Sotera* stipulation, removing duplication, it has challenged claims beyond just those asserted in the parallel litigation, the trial date is yet uncertain for this patent given the large number of patents at issue in the parallel litigation, and Petitioner’s arguments on the merits here are strong. The ’001 patent issued in 2021, so Patent Owner has no long-settled expectation of validity.

Petitioner will address discretionary denial in full during the bifurcated briefing process.

X. Mandatory Notices

A. Real Parties-in-Interest Under 37 C.F.R. § 42.8(b)(1)

Google LLC is the real party-in-interest for this Petition.[1]

[1] Google LLC is a subsidiary of XXVI Holdings Inc., a subsidiary of Alphabet Inc. XXVI Holdings Inc. and Alphabet Inc. are not real parties-in-interest here.

B. Related Matters Under 37 C.F.R. § 42.8(b)(2)

To the best of Petitioner's knowledge, the '001 patent is involved in the following district court litigations:

Name	Number	Court	Filed
Sonos, Inc. v. Google LLC	2:20-cv-00169	C.D. Cal.	Jan. 7, 2020

C. Lead and Back-Up Counsel Under 37 C.F.R. § 42.8(b)(3)

Lead Counsel	Back-Up Counsel
Erika H. Arner (Reg. No. 57,540) erika.arner@finnegan.com Finnegan, Henderson, Farabow, Garrett, & Dunner LLP 1875 Explorer Street, Suite 800 Reston, VA 20190-6023 Tel: 571-203-2754 Fax: 202-408-4400	Kara A. Specht (Reg. No. 69,560) kara.specht@finnegan.com Finnegan, Henderson, Farabow, Garrett, & Dunner LLP 271 17th Street, NW, Suite 1400 Atlanta, GA 30363-6209 Tel: 404-653-6481 Fax: 404-653-6444
	Cory C. Bell (Reg. No. 75,096) cory.bell@finnegan.com Finnegan, Henderson, Farabow, Garrett, & Dunner LLP 2 Seaport Lane, 6th Floor Boston, MA 02210-2001 Tel.: 617-646-1641 Fax: 202-408-4400
	Safiya Aguilar (Reg. No. 77,212) safiya.aguilar@finnegan.com Finnegan, Henderson, Farabow, Garrett, & Dunner LLP 901 New York Avenue NW Washington, DC 20001-4413 Tel.: 202-408-4160 Fax: 202-408-4400
	William C. Neer (Reg. No. 78,874) william.neer@finnegan.com Finnegan, Henderson, Farabow, Garrett & Dunner LLP 901 New York Avenue, NW Washington, DC 20001-4413 Tel: 202-408-4054 Fax: 202-408-4400

D. Service Information Under 37 C.F.R. § 42.8(b)(4)

Please address correspondence to lead and back-up counsel at the e-mail addresses above. Petitioner consents to electronic service by e-mail.

XI. Standing

Petitioner certifies that the ’001 patent is available for IPR, and Petitioner is not barred or estopped from requesting IPR on the grounds identified in this Petition.

XII. Conclusion

Petitioner has established a reasonable likelihood of prevailing for the challenged claims and requests the Board institute IPR and cancel the challenged claims.

Date: October 14, 2025

Respectfully submitted,

/Erika H. Arner/
Erika H. Arner, Lead Counsel
Reg. No. 57,540

CERTIFICATE OF COMPLIANCE

The undersigned hereby certifies that the foregoing **Petition for *Inter Partes* Review** contains 13,888 words, excluding those portions identified in 37 C.F.R. § 42.24(a), as measured by the word-processing system used to prepare this paper.

/Erika H. Arner/
Erika H. Arner, Lead Counsel
Reg. No. 57,540

CERTIFICATE OF SERVICE

The undersigned certifies that the foregoing Petition for *Inter Partes* Review, Power of Attorney, and all supporting exhibits were served on October 14, 2025 by FedEx Priority Overnight at the following address of record for the subject patent:

Jeffrey Armstrong
Akerman LLP / Sonos, Inc.
777 S. Flagler Drive, Suite 1100 West Tower
West Palm Beach, FL 33401
UNITED STATES

Date: October 14, 2025

/Lisa C. Hines/
Lisa C. Hines
Case Manager
FINNEGAN, HENDERSON, FARABOW, GARRETT & DUNNER, LLP