

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

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LINKPLAY TECHNOLOGY INC.

Petitioner

v.

SONOS, INC.

Patent Owner

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IPR2025-00511

U.S. PATENT NO. 9,213,357

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**PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 9,213,357**

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EX1003	Declaration of Dr. Bruce Hartpence
EX1004	<i>Ex Parte</i> Reexamination (Control No. 90/013,959) History of Claims 9-12 and 19 of the ’357 Patent
EX1005	U.S. Patent App. Pub. No. US 2003/0083024 A1 (“Richenstein”)
EX1006	Claim Construction Decisions from <i>Sonos, Inc. v. D&amp;M Holdings</i>
EX1007	MOST May 2000 Press Release
EX1008	MOST Specification Rev. 2.0 (“MOST-2.0”)
EX1009	U.S. Patent No. 7,116,894 (“Chatterton”)
EX1010	RFC1889
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EX1019	A Technology Comparison, Memson Corporation
EX1020	Konica Minolta Feb. 2003 Press Release
EX1021	Microtek Nov. 2002 Press Release
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EX1042	IEEE - History of IEEE
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EX1044	U.S. Patent No. 6,947,776

All emphases in quotations are added unless otherwise noted.

This paper includes color illustrations and should be viewed in color.

## I. INTRODUCTION

Linkplay Technology Inc. (“Petitioner”) petitions for *inter partes* review (“IPR”) of claims 1-20 (“challenged claims”) of U.S. Patent No. 9,213,357 (“’357 Patent,” EX1001) assigned to Sonos, Inc. (“PO”).

The challenged claims recite a playback device that obtains audio content from sources outside a local network, generates and transmits audio data along with its playback timing and clock information to another playback device over the local network for synchronous playback, which had been well-known in the networked consumer electronic device industry prior to the earliest possible priority date of the ’357 Patent. For instance, the claimed functions of the playback device, including “*obtaining, by the first playback device from the audio information source outside of the LAN, the audio information*” after receiving control information, “*transmitting, by the first playback device to a second playback device, the audio information, playback timing information associated with the audio information, and device clock information of the first playback device,*” and “*playing back, by the first playback device, the audio information in synchrony with the second playback device,*” are clearly and extensively disclosed in each of U.S. Patent Application Publication No. 2003/0083024 (“Richenstein,” EX1005), and U.S. Patent No. 7,116,894 (“Chatterton,” EX1009), alone or in view of the standard specifications Richenstein and Chatterton used, including “MOST Specification Rev. 2.0”

(“MOST-2.0,” EX1008) and “RTP: A Transport Protocol for Real-Time Applications” (“RFC1889,” EX1010). The additional claim limitations merely represent minor design variations or industry-standard practices, all of which were known or obvious, as demonstrated by the cited prior art references.

Petitioner’s expert, Dr. Bruce Hartpence, who has decades of experience in information technology, confirms that the challenged claims are unpatentable over these references.

Petitioner thus respectfully requests the Board cancel the challenged claims.

## **II. RELIEF REQUESTED**

### **A. Claims for Which Review Is Requested**

Petitioner requests IPR and cancellation of challenged claims 1-20 of the ’357 Patent under 35 U.S.C. § 311 based on the following grounds. This Petition is supported by the Declaration of Dr. Bruce Hartpence (EX1003).

### **B. Statutory Grounds of Challenge**

Petitioner relies on the following prior art and statutory grounds of challenge to claims 1-20 of the ’357 Patent:

Name	Ex.	Publication No.	Filed	Published	Prior art under at least
Richenstein	1005	US 2003/0083024	07/03/2002	05/01/2003	§§ 102(a), (e)
MOST-2.0	1008	MOST (Media Oriented Systems Transport) Specification Rev. 2.0		Dec. 1999	§§ 102(a), 102(b)
Chatterton	1009	US 7,116,894	05/24/2002	10/03/2006	§ 102(e)
RFC1889	1010	RTP: A Transport Protocol for Real-Time Applications		Jan. 1996	§§ 102(a), 102(b)

Ground	Claims	Basis	References
1	1-20	§ 102	Richenstein
2	1-20	§ 103	Richenstein
3	4-7, 12-17	§ 103	Richenstein in view of MOST-2.0
4	1-20	§ 102	Chatterton
5	1-20	§ 103	Chatterton
6	1-20	§ 103	Chatterton in view of RFC1889

Richenstein (EX1005) and Chatterton (EX1009) were filed prior to the earliest possible filing date<sup>1</sup> of the '357 Patent and therefore are prior art under at least § 102 (e).<sup>2</sup> Richenstein (EX1005) was also published prior to the earliest possible filing date of the '357 Patent and is prior art under § 102(a).

MOST-2.0 (EX1008) and RFC1889 (EX1010) are non-patent printed

<sup>1</sup> The '357 Patent is not entitled to its alleged priority dates, including the filing date of the Provisional Application No. 60/490,768, July 28, 2003. However, this Petition does not need to reach this issue as the references are prior art regardless.

<sup>2</sup> PO has alleged, but not proven, an invention date of April 25, 2003. PO has the burden of production to prove such date in this IPR. Even if successful, however, Richenstein is still prior art under § 102(e).

publications under §§ 102(a) and (b) against the '357 Patent as they were each publicly accessible at least by July 11, 2002, before the PO's alleged invention date and more than one year before the earliest possible effective filing date of the '357 Patent. *Hulu, LLC v. Sound View Innovations, LLC*, IPR2018-01039, Paper 29 at 19-21 (precedential).

MOST-2.0 is marked with 12/1999 and a copyright statement "1999-2000 MOST Cooperation" on its cover. EX1008, 1. MOST-2.0 Cooperation was a well-known entity in the field of media networking and made its specifications publicly available on its website by at least May 22, 2000. EX1007, 1; EX1003, ¶99. MOST-2.0 itself also confirms that it was available at the time to the public on a "MOST Cooperation Web Site." EX1008, 2. Members of the networking field referenced and cited to MOST, including the same MOST-2.0 document, confirming its public accessibility by July 11, 2002. EX1005, [0171]; EX1044, 5:12-13; EX1003, ¶100.

RFC1889 is marked with "January 1996" as a "Request for Comments" memo from the Audio-Video Transport Working Group. EX1010, 1. Petitioner's expert, Dr. Hartpence, has also testified sufficiently to show that the well-known organization IETF publishes RFCs as references for those in the field, including RFC1889, and further testifies that he and others similarly in the field had access to RFC1889 before July 11, 2002. EX1003, ¶117.

Accordingly, both MOST-2.0 and RFC1889 were "disseminated or otherwise

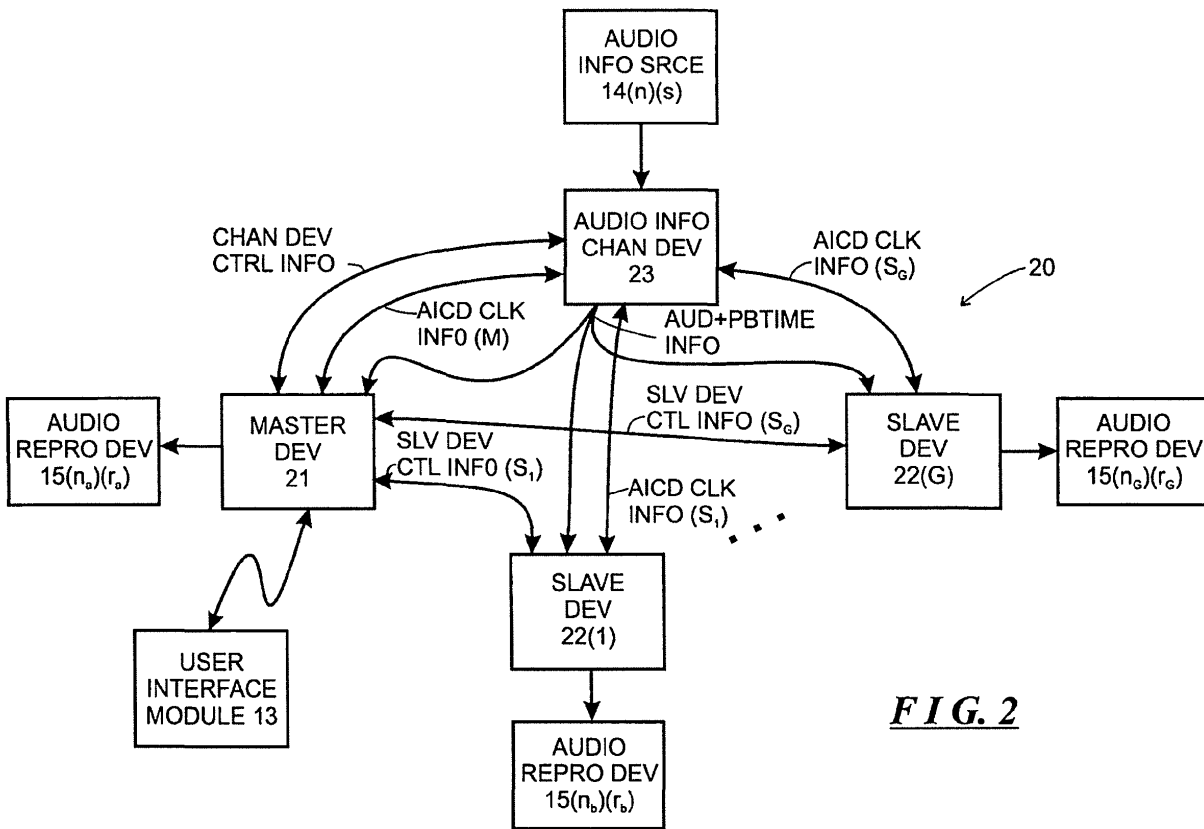
made available to the extent that persons interested and ordinarily skilled in the subject matter or art exercising reasonable diligence, can locate it” before July 11, 2002. *Kyocera Wireless Corp. v. International Trade Comm’n*, 545 F.3d 1349, 1350 (Fed. Cir. 2008).

### **III. THE ’357 PATENT**

#### **A. Overview**

The ’357 Patent describes “a plurality of audio playback devices that receive digital audio information that is to be played back in synchrony.” EX1001, 3:38-40. The ’357 Patent describes that a first device assigns tasks “associated with a timestamp” for execution by the other devices. EX1001, 3:53-55. Then, the first device periodically indicates the current time of its own clock, which is used by all devices to execute the task at the correct time. EX1001, 1:56-62.

The ’357 Patent discloses a local area network (LAN) of playback devices, including an “audio information channel device 23,” a “master playback device 21,” and one or more “slave playback devices 22.” EX1001, 7:51-17:53, FIG. 2. According to the ’357 Patent, device 23 is a centralized hub that coordinates audio information between an audio information source outside the LAN and the playback devices on the LAN. *Id.*



**FIG. 2**

The '357 Patent describes device 23 obtaining audio information, adding playback timing information, and distributing the combined audio and playback timing information to the other playback devices. EX1001, 7:66-8:4. To achieve “simultaneous” playback, device 23 also sends “clock time information to the master device 21 and each of the slave devices 22(g) individually over network 12 using a highly accurate clock time information transmission methodology.” EX1001, 8:5-11, 11:25-29. The '357 Patent explains that “clock time information” can be distributed using the “well-known SNTP protocol.” EX1001, 11:35-47, 12:39-45, 16:40-44, 17:34-39, 22:65-23:6, 24:32-38, 25:58-66. According to the '357 Patent,

device 23 and master playback device 21 are preferably different devices, although in some implementations, they may be the same device. EX1001, 8:39-55, 7:60-66; EX1003, ¶¶65-68.

## **B. Prosecution History**

In the first Office Action, the Examiner rejected claims 1-20 as being unpatentable under pre-AIA 35 U.S.C. 103(a) over combinations of App. Pub. No. 2007/0142944A1 (“Goldberg”), App. Pub. No. 2005/0027821A1 (“Alexander”), and App. Pub. No. 2003/0073432A1 (“Meade”). EX1002, 347-51. After an interview where agreement could not be reached, PO responded to the rejections with amendments, arguing that the prior art lacked control information sent to the second playback device. EX1002, 321-325.

The Examiner disagreed and subsequently issued a Final Office Action rejecting claims 1-20 over Goldberg in view of Meade alone. EX1002, 279. PO conducted an interview to propose specifying that the playback is “based at least in part on the playback timing information associated with the audio information and the clock information of the first playback device.” EX1002, 167, 161. PO argued “none of the cited references teach that playback is based on the clock information.” EX1002, 160. Examiner again disagreed as the amendment failed to specify how device clock information was incorporated into playback, which is “*essential for*

*allowability because this is the core of the inventive concept.*” EX1002, 160 (emphasis added).

PO then filed an after-final response and amended the independent claims to include the first playback device transmitting to the second device “the audio information, playback timing information associated with the audio information, and device clock information of the first playback device” and playing back “in synchrony with the second playback device by using the playback timing information associated with the audio information to play back the audio information.” EX1002, 169-175.

After two more interviews, and a Request for Continued Examination, the Examiner issued a Notice of Allowance noting none of the prior art discloses the features added in PO’s last amendment. EX1002, 62-78.

### **C. Reexamination of the ’357 Patent**

On June 16, 2017, the USPTO issued a Decision Granting *Ex Parte* Reexamination (“Decision”) of claims 9-12 and 19 of the ’357 Patent in Control No. 90/013,959. EX1004, 4062-84. In the Decision, the Examiner construed the terms *independently clocked* to mean “the master does not run the other device’s clocks, the master device merely sets a sync point” and *playback timing information* to be “a type of time stamp” under the broadest reasonable interpretation standard. EX1004, 4072-73. The Examiner issued an Office Action including 6 grounds of

rejection, and then a Final Office Action rejecting claims over App. Pub. No. 2004/0252400 (“Blank”), App. Pub. No. 2002/015015003 (“Gray”), and applicant admitted prior art. EX1004, 501, 505, 370, 373-74. Without disputing that Blank teaches the synchronization of media players using a time server and Gray teaches a media server timestamping audio information, PO took issue with the motivation to combine them. *See, e.g.*, EX1004, 261-62.

PO further cited to litigation documents regarding previous defendant D&M’s internal operations in 2011-2013 as evidence of secondary indicia of non-obviousness. EX1004, 267-279. The Examiner maintained the rejections, leading to PO’s appeal to the Board. EX1004, 222. The Board reversed the Examiner’s rejections based on conclusions of indicia of non-obviousness. EX1004, 32.

**D. The Level of Ordinary Skill in the Art**

A person of ordinary skill in the art (POSITA) at the time of the claimed invention would have had a Bachelor’s degree in electrical engineering, computer engineering, computer science, information technology, or a related field, along with at least two years of experience in the design or development of connected consumer electronics, networked engineering, or the equivalent. EX1003, ¶17. Additional graduate education could substitute for professional experience, or significant experience in the field could substitute for formal education. EX1003, ¶17.

#### IV. CLAIM CONSTRUCTIONS

Claim terms subject to IPR are construed under *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005). 37 C.F.R. § 42.100(b). Only terms necessary to resolve the controversy need construction. See *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor*, 868 F.3d 1013, 1017 (Fed. Cir. 2017). Because the prior art asserted herein discloses embodiments indisputably within the claims' scope, the Board needs not construe the claims, and all claim terms should be interpreted according to their plain and ordinary meaning. EX1003, ¶¶78-83. Claim construction has not begun in the co-pending litigation to which Petitioner is a party and decisions will not issue until after the institution decision in this IPR.<sup>3</sup>

Certain terms of the '357 Patent were construed by the District Court of Delaware in *Sonos, Inc. v. D&M Holdings et. al.*, No. 1:14-cv-01330 (D. Del.) ("previous constructions," summarized below).<sup>4</sup> EX1006. Dr. Hartpence considered these previous constructions and confirms that the prior art asserted herein still discloses the relevant claim limitations even if the previous constructions are applied. EX1003, ¶¶78-83.

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<sup>3</sup> Petitioner reserves the opportunity to address those constructions later in the trial.

<sup>4</sup> Two terms, "independently clocked" and "playback timing information" were also interpreted under the broadest reasonable interpretation by the Office during reexamination. EX1004, 506-507.

Terms	Previous Constructions
clock information	information representing a time value indicated by a device's clock
playback device	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
independently clocked	operating in accordance with their own respective clocks during synchronous playback
audio information	no construction necessary

**V. GROUNDS 1-2: RICHENSTEIN ANTICIPATES OR RENDERS OBVIOUS CLAIMS 1-20.<sup>5</sup>**

**A. Overview of Richenstein**

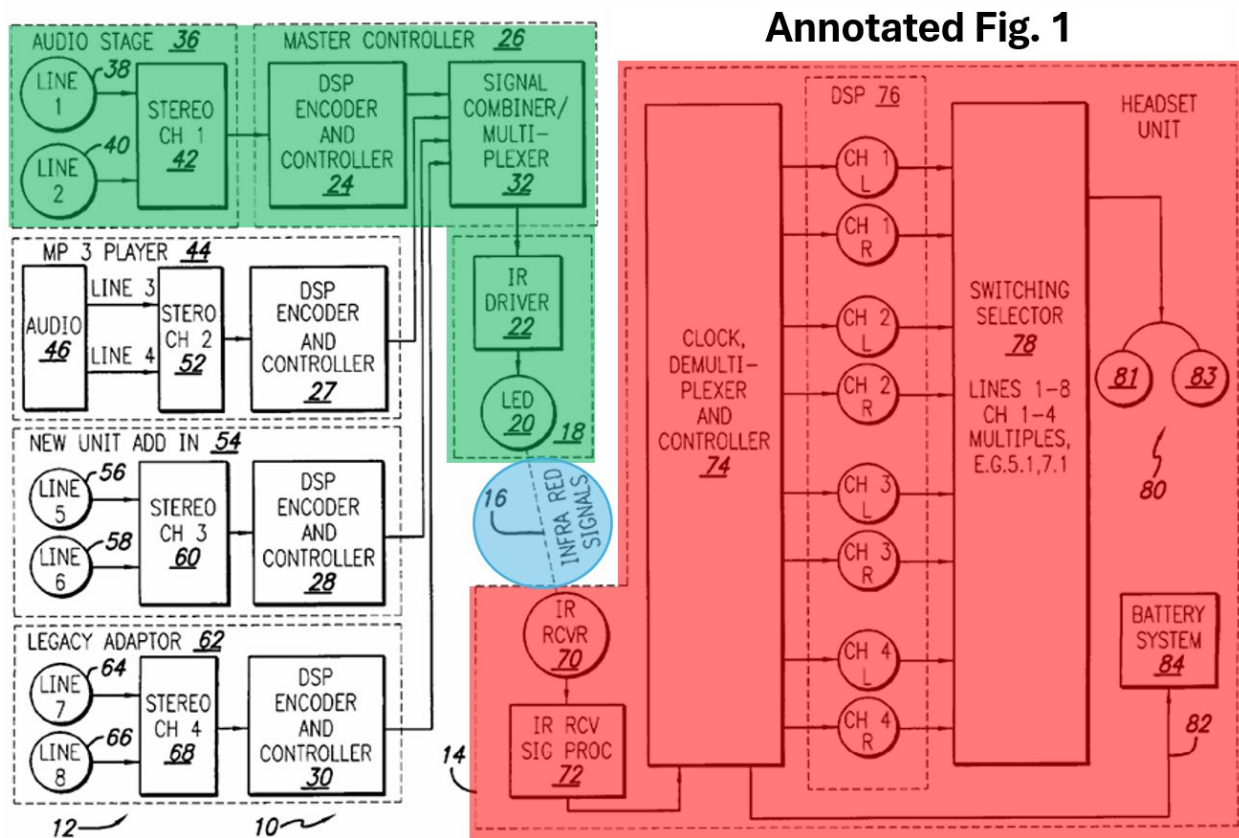
Like the '357 Patent, Richenstein describes devices, methods, and systems for sharing and synchronizing audio playback on a network of audio devices. EX1005, Abstract. Richenstein explains that its invention allows multiple sources of audio to be shared by multiple listeners. EX1005, [0002].

To achieve this, Richenstein discloses playback devices for distributing audio data and control information using networked audio devices, including transmitters,

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<sup>5</sup> Grounds 1-2 analysis of claims 4-7 and 12-17 is included in Section VI.

receivers, and “two-way” (*bidirectional*) wireless devices. See e.g., EX1005, [0033]-[0035], [0040]-[0041], [0159], [0161], Figs. 1, 19-23. With reference to Fig. 1 below, audio device 34 retrieves audio from various audio sources, multiplexes them, and transmits streams of signals 16 on a local network (system 10) to headset 14. EX1005, [0033]-[0041]; EX1003, ¶¶86-87.



EX1003, ¶87 — EX1005, FIG. 1 (Annotated)

Richenstein describes audio devices 34 as standalone playback audio devices or “the audio portions” of playback devices. EX1005, [0036]. Richenstein further describes that audio device 34 can be controlled using remote controllers such as

836/936. EX1005, [0152], [0166]; *see also* EX1003, ¶¶88-90.

System 10's playback devices each include a clock for playback. EX1005, Fig. 1 (showing the clock of headphones 14), Figs. 7 and 8 (showing device clocks of an audio device); EX1003, ¶91.

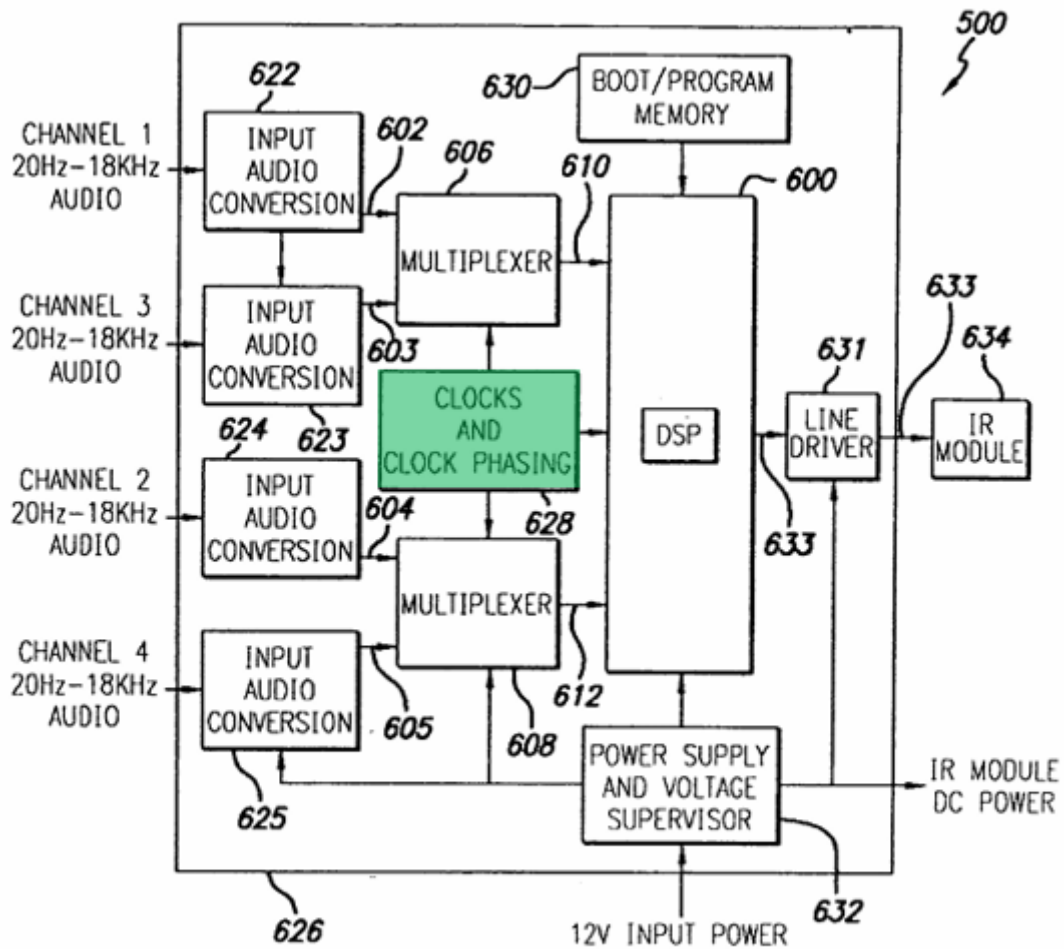


FIG. 7

EX1003, ¶91 — EX1005, FIG. 7 (Annotated)

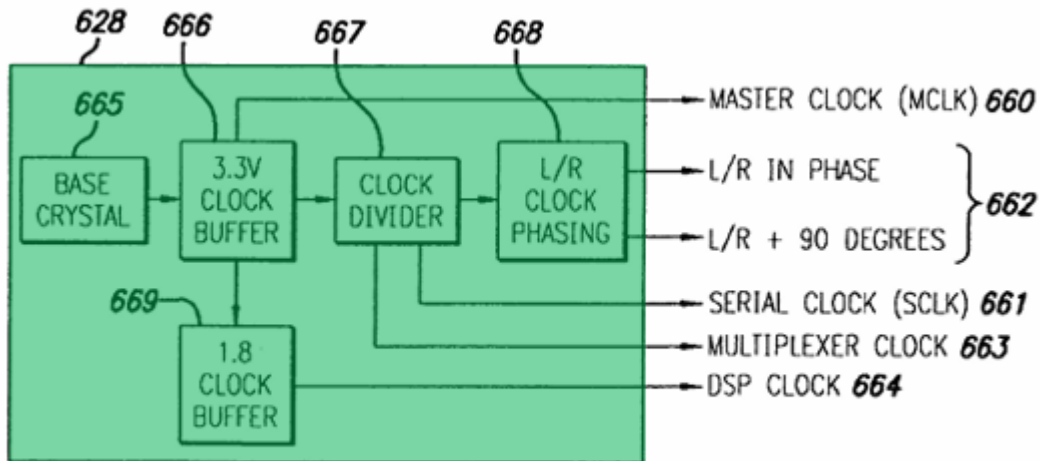
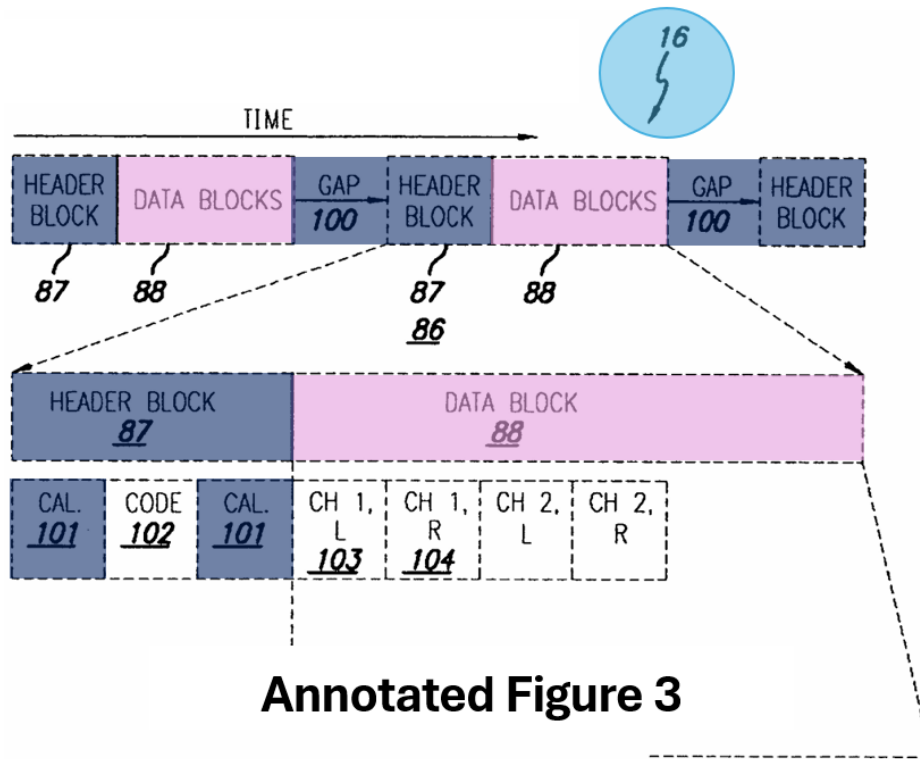


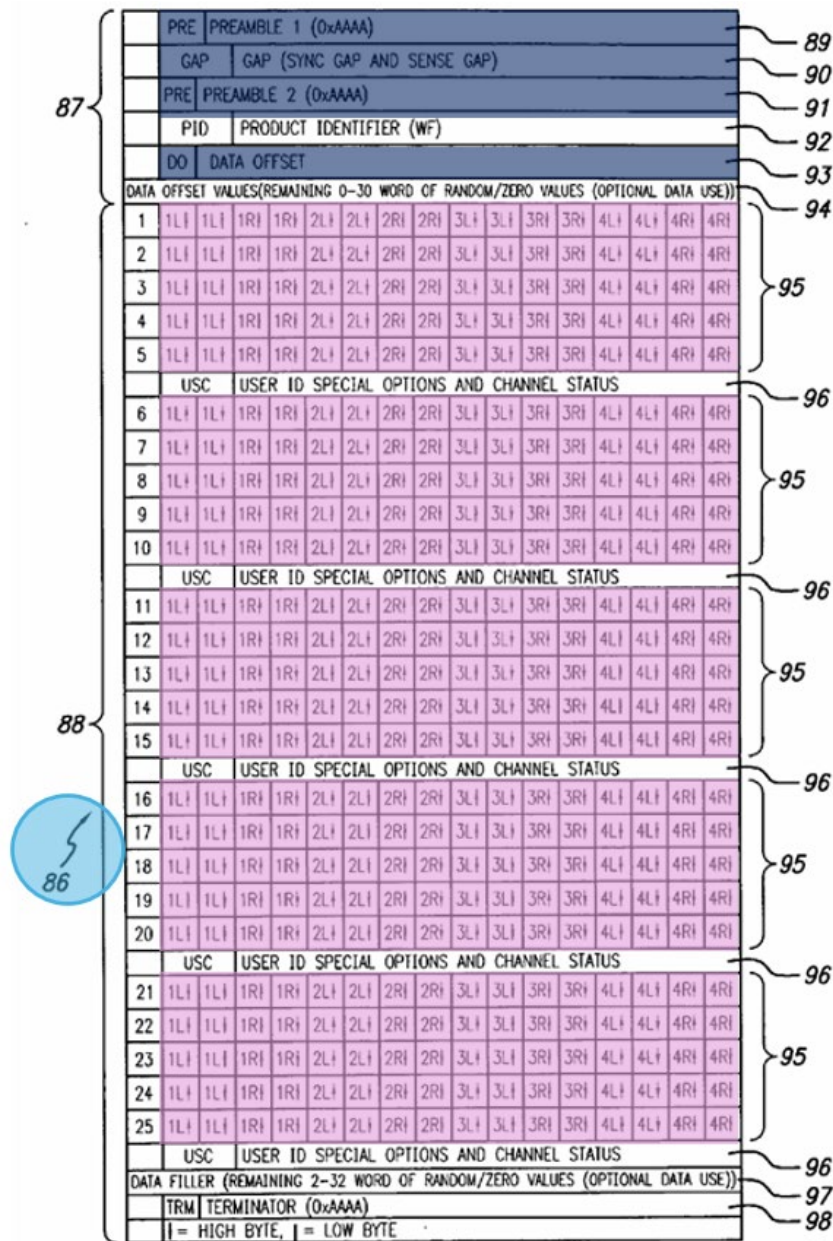
FIG. 8

**EX1003, ¶91 — EX1005, FIG. 8 (Annotated)**

For these independently clocked devices to playback audio content in synchrony, signals 16 include both “digitized audio data” and “calibration data, and code or control data” for synchronized playback. EX1005, [0033], [0057]; EX1003, ¶92. Figs. 3 and 12 below illustrate data packets of signals 16 for synchronizing the playback between playback devices, including using header blocks 87, gap fields 100 and 90, and calibration fields 101. EX1005, [0066]-[0069], [0101]-[0102]; EX1003, ¶92.



EX1003, ¶92 — EX1005, FIG. 3 (Annotated)

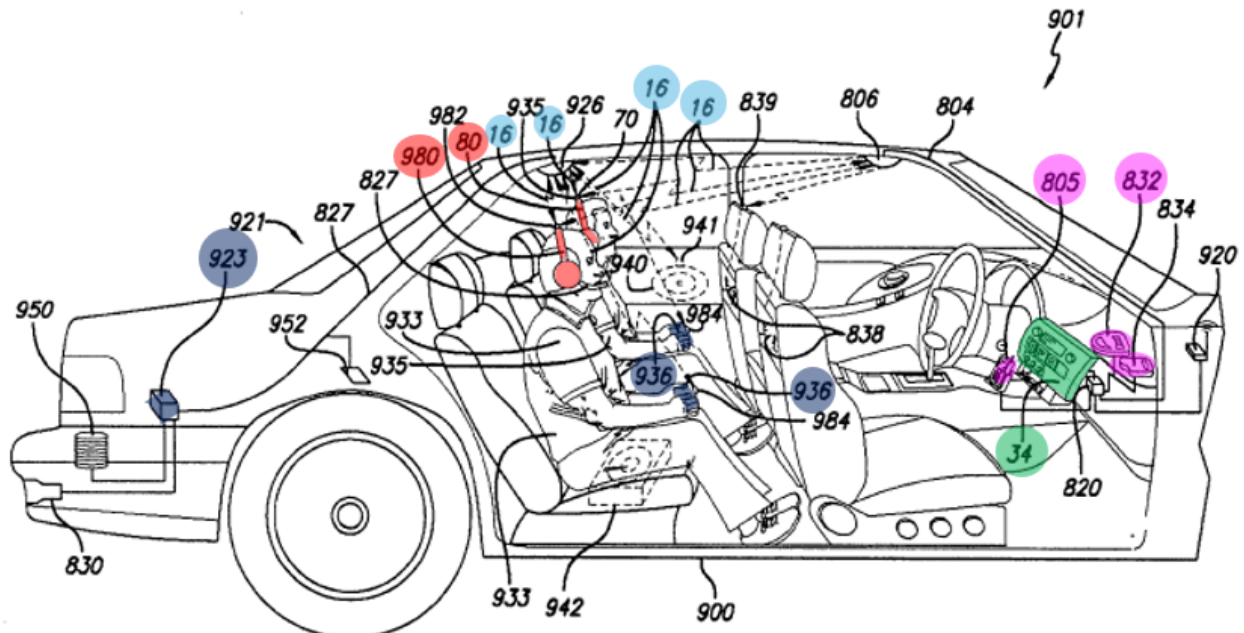


**Annotated Fig. 12**

EX1003, ¶92 — EX1005, FIG. 12 (Annotated)

Richenstein further discloses embodiments of audio system 10, including in-vehicle audio systems in Figs. 19-22 and home audio systems in Fig. 23. See EX1003, ¶93. For example, Fig. 21 below shows remote controllers 936 (dark blue) in

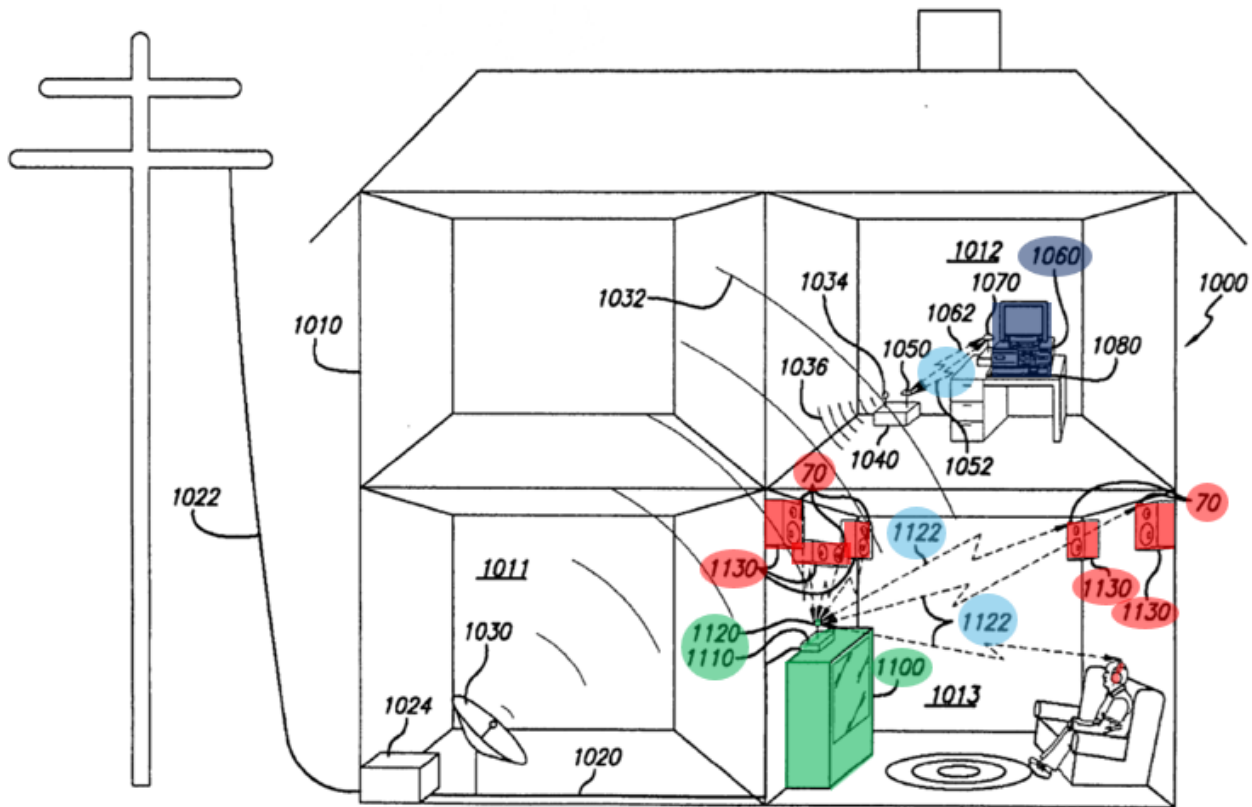
communication with audio device 34 (green) to control various devices including, e.g., cellular telephone 805, game console 922, DVD player 803, CD changer 950, headsets 980 and 80. EX1005, [0166]; EX1003, ¶96.



**Annotated Figure 21**

**EX1003, ¶96 — EX1005, FIG. 21 (Annotated)**

Further, Fig. 23 below shows a local home network with a home theatre system 1100 (green) “connected to network 1020 to receive television and audio programming,” home theatre speakers 1130 (red), and a PC 1060 (dark blue) for controlling them. EX1005, [0176]; EX1003, ¶98.



**Annotated Figure 23**

EX1003, ¶98 — EX1005, FIG. 23 (Annotated)

**B. Independent Claim 1**

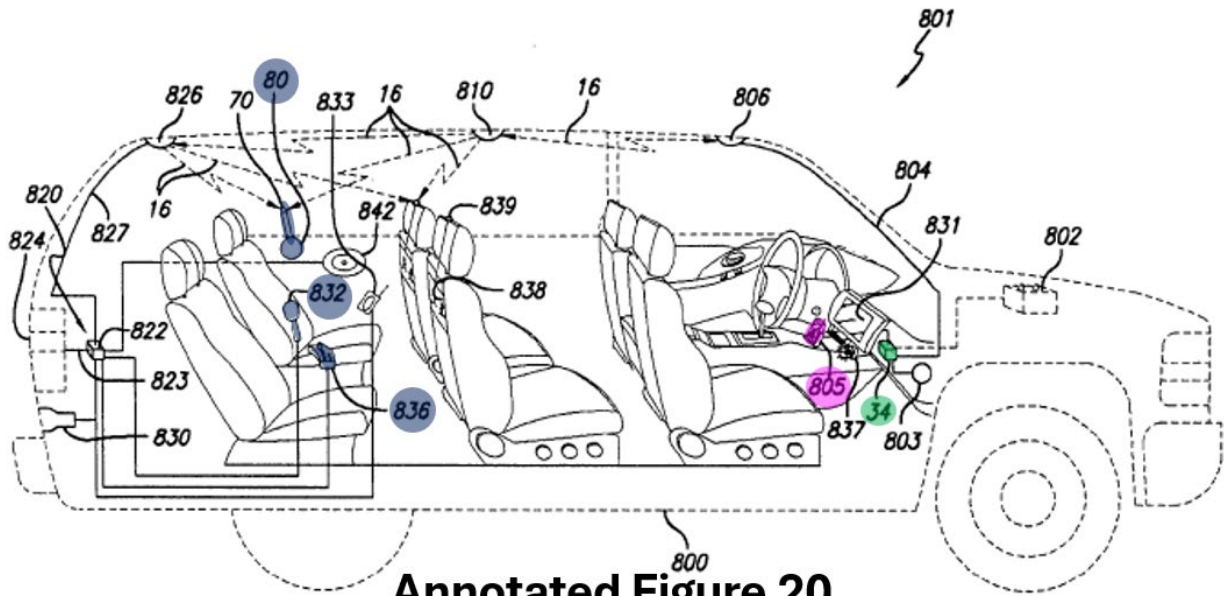
**1. Richenstein discloses [1.P] A method comprising**

Richenstein discloses “[a] method.” Specifically, Richenstein discloses multiple methods for synchronous audio playback over a network. *See, e.g.*, EX1005, [0003], [0005], [0050], [0052]-[0053], [0070], [0149], [0153], [0165]-[0166], and Figs. 1-23; *see also* EX1003, ¶132.

2. **Richenstein discloses [1.1.1] receiving, by a first playback device from a network device configured to control the first playback device and communicatively coupled to the first playback device over a local area network (LAN), control information comprising an address identifying a location of audio information available at an audio information source,**

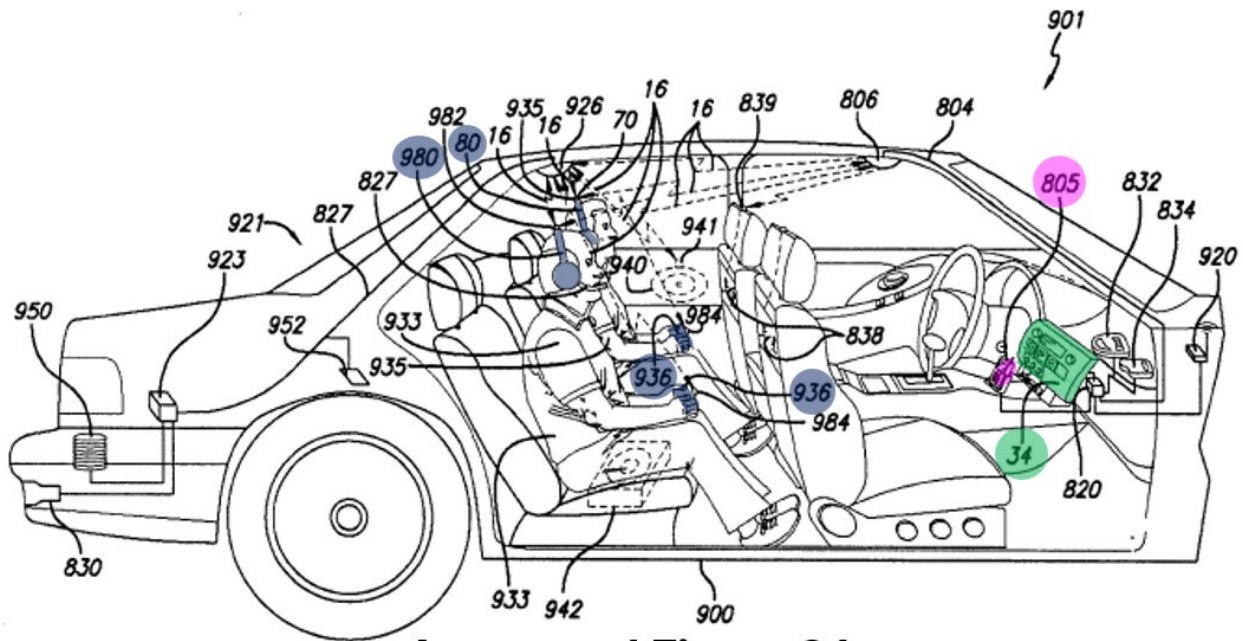
Richenstein discloses element [1.1.1] in multiple embodiments, including Figs. 20 and 21's vehicle infotainment embodiments and Fig. 23's home entertainment embodiment.

In Figs. 20 and 21, Richenstein discloses audio device 34 (“*a first playback device*”) as a data network device that processes and outputs audio. *See, e.g.*, EX1005, [0005], [0033], [0040]-[0041], [0044], [0049], [0052]-[0055], [0057]-[0058], [0064]-[0069], Figs. 1 and 19-23; EX1003, ¶135. For example, audio device 34 may be any of exemplary audio playback devices including “mono and stereo radios, CD and cassette players, mini-disc players” or as an audio playback device in exemplary multimedia players including “computers, television sets, DVD players and the like.” EX1005, [0036], [0139], [0162].



**Annotated Figure 20**

EX1003, ¶139 — EX1005, FIG. 20 (Annotated)

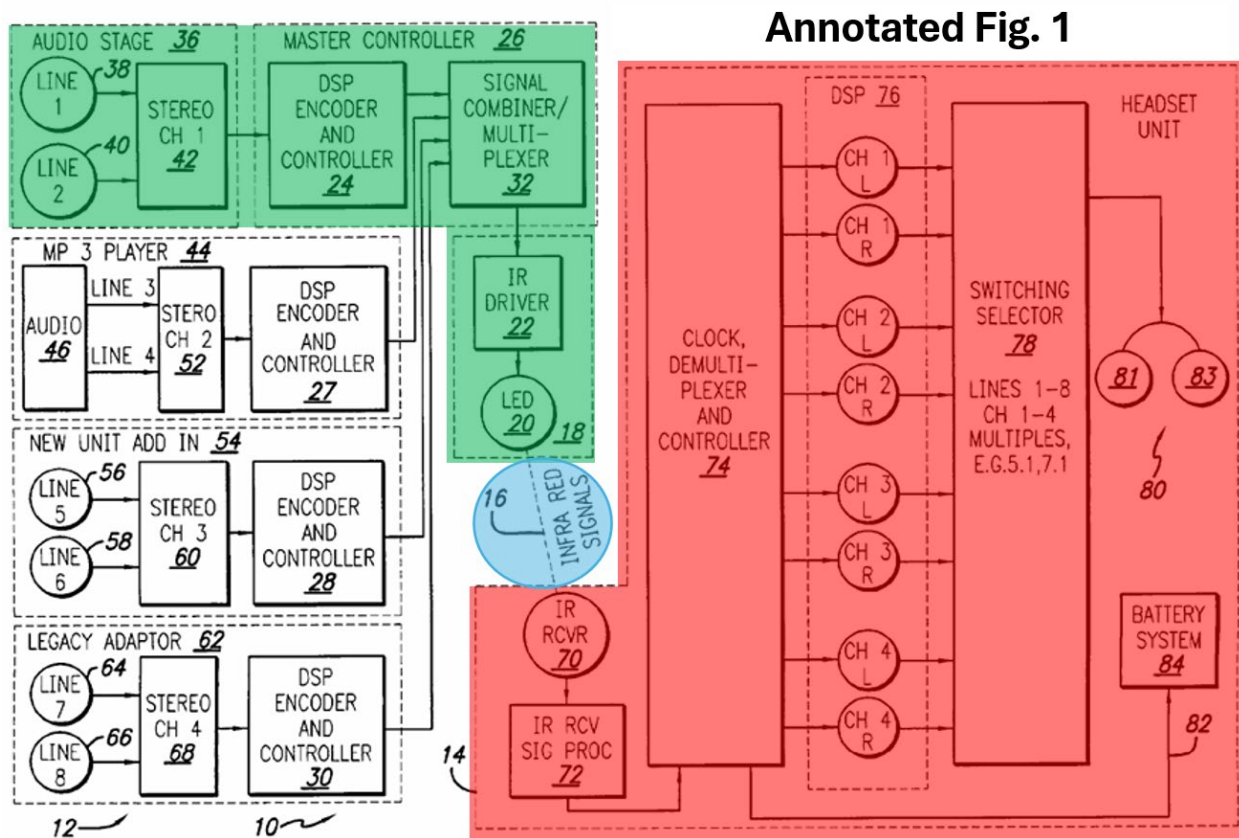


**Annotated Figure 21**

EX1003, ¶139 — EX1005, FIG. 21 (Annotated)

Audio device 34 receives audio from exemplary audio sources 44 (MP3

player), 54 (New Unit Add In), and 62 (Legacy Adaptor), processes audio with digital signal processing components (master controller 26 with DSP encoder 24), and transmits audio signals 16 to other playback devices (exemplary headset 14) in a networked audio system 10 (“local area network”). EX1005, [0033]-[0041], FIG. 1; EX1003, ¶136.



EX1003, ¶136 — EX1005, FIG. 1 (Annotated)

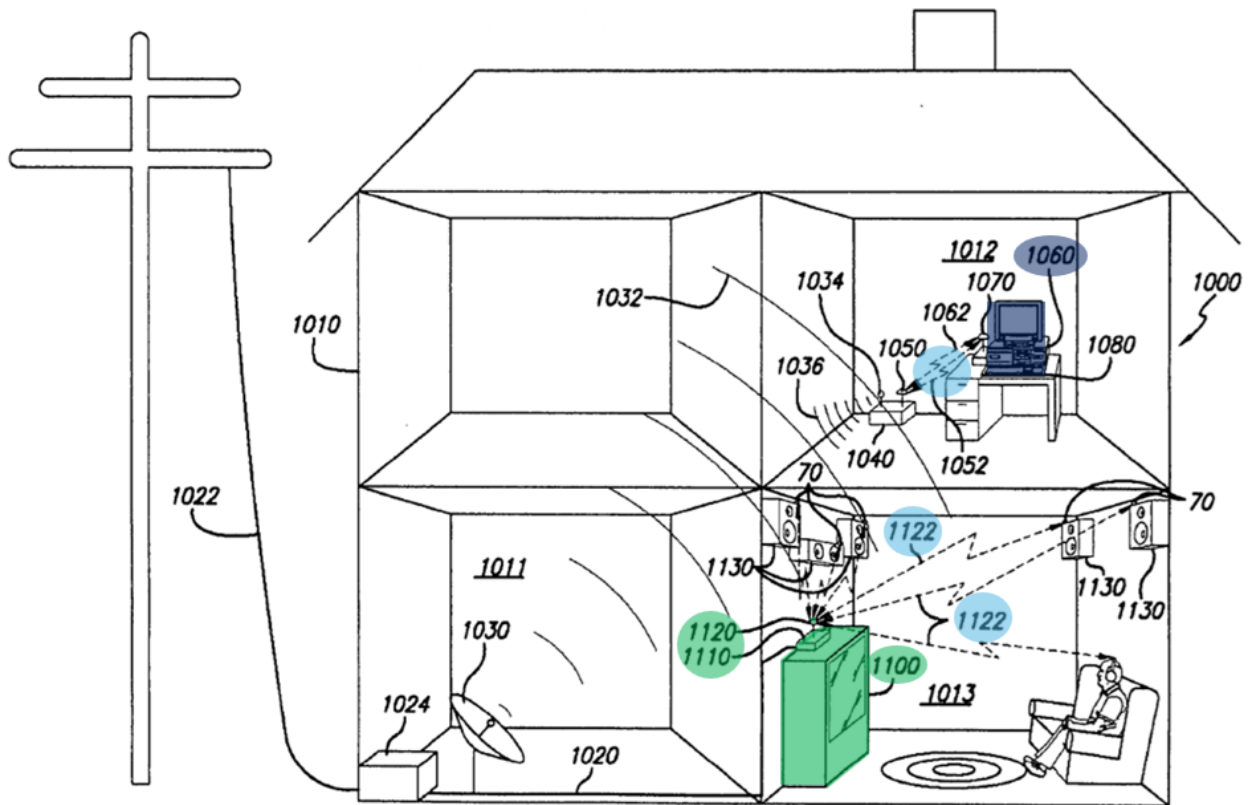
A POSITA would understand that audio device 34 may include its own speakers, as exemplary embodiments like mono and stereo radios and TV’s would include. EX1005, Figs. 19-23; EX1003, ¶¶135-36. Accordingly, Richenstein’s audio

device 34 is a playback device. EX1003, ¶136.

Richenstein further discloses game controllers 836/936, microphone 832/984, and headphones 80/980, shown in dark blue in annotated Figs. 20 and 21 above (each a “*network device*”), may send commands to audio device 34 (in green), (“*configured to control the first playback device*”) using local wireless network signals 16 (“*over a local area network*”) to control and access the cellular telephone 805 (in pink) (“*an audio information source*”). EX1005, [0149], [0153], [0165]-[0166]; EX1003, ¶139. For example, Richenstein discloses game controllers 836/936 commanding audio device 34 to access cellular phone 805 to answer a call, or headphones 80/980 commanding audio device 34 to initiate phone calls on cell phone 805. EX1005, [0165]-[0166]; EX1003, ¶¶140-41. Richenstein explicitly discloses cellular telephone 805 as a source for audio device 34 to retrieve “a voice stream” or “audio data,” which then encodes the data for IR transmission over the local network. EX1005, [0146], [0161]. Richenstein’s audio device 34 also receives audio data from various other audio information sources, such as digital satellite radio. EX1005, [0161]. Richenstein further discloses the importance and necessity of addressing audio data transmitted over the network. EX1005, [0173]; EX1003, ¶142. A POSITA would understand that for audio device 34 to access and retrieve audio information of a call (either answered or initiated) on cellular phone 805, the command from controllers 836/936 to audio device 34 must identify an address of

the location of such audio information on phone 805, such as the location specifically related to phone call functions. Thus, Richenstein discloses or suggests that the commands from the control devices (“*network device*”) to audio device 34 (“*the first playback device*”) indicates “*address identifying a location of audio information available at*” cellular phone 805 (“*an audio information source*”). EX1003, ¶¶141-143.

Richenstein also discloses or suggests element [1.1.1] in its home embodiment of Fig. 23. Richenstein discloses a home theater system 1100 along with decoder 1110 and transmitter 1120, which “receive[s] television and audio programming.” EX1005, [0176]; EX1003, ¶144. Richenstein discloses home theatre system 1100 as an embodiment of audio device 34, shown in green, and for reasons stated above, home theater system 1100 is also a playback device (“*a first playback device*”). EX1005, [0041], [0167], Fig. 23 (showing home theater system 1100 as a TV); EX1003, ¶144. Computer 1060 (in dark blue) (a “*network device*”) is connected to (“*communicatively coupled*”) and may send commands to home theatre system 1100 (“*configured to control the first playback device*”) via LAN 1020 (“*over a local area network*”). EX1005, [0149], [0153], [0165]-[0166]; EX1003, ¶¶145-146.



**Annotated Figure 23**

**EX1003, ¶144 — EX1005, FIG. 23 (Annotated)**

Computer 1060 is equipped with IR transmitter/receiver 1070 and encoder/decoder 1080 and process and transmit control information to other devices on network 1020. EX1005, [0175]; EX1003, ¶¶145-46. PC was well-known to a POSITA at the time for its ability to control other devices it connects to, and its versatile control functions including controlling audio devices. Devices on network 1020 are remotely controlled. EX1005, [0176]; EX1003, ¶145. Therefore, a POSITA would understand home theater device 1100 is controllable by PC 1060, e.g., in ways similar to other controller devices disclosed by Richenstein. EX1005, [0149], [0152],

[0153], [0162], [0166]; [0149], [0165], [0166]; EX1003, ¶145.

Richenstein discloses LAN 1020 connects to network 1022 for “media content such as television and music channels, and further to provide a connection to the Internet via cable modem 1024.” EX1005, [0174]-[0175]. For home theatre system 1100 to access and retrieve “television and audio programming” (“*audio information*”) from cable television network 1022 or a media source on the Internet (“*audio information sources*”), the control information must indicate the content storage locations and/or URLs (“*addresses identifying a location of audio information*”). EX1003, ¶146.

**3. Richenstein discloses [1.1.2] wherein the audio information source is outside of the LAN; and**

As explained for [1.1.1], Richenstein discloses *audio information source* such as cell phone 805 in its vehicle embodiments or cable television network 1022/a media source on the Internet in its home embodiment. *Supra*, Section V.B.2.

Figs. 20/21 shows Richenstein’s cellular phone 805 communicates with the local network via audio device 34, but cellular phone 805 itself is on a cellular network outside the local network carrying signals 16 (“*outside of the LAN*”). EX1005, [0146]; EX1003, ¶¶149-50.

Fig. 23 shows that Richenstein’s “television and music channels” are on external cable network 1022 or on “the Internet” connected to network 1020 through

cable modem 1024 (“*outside of the LAN*”). EX1005, [0174]; EX1003, ¶¶151-52.

4. **Richenstein discloses [1.2.1] after receiving the control information (i) obtaining, by the first playback device from the audio information source outside of the LAN, the audio information;**

Richenstein discloses element [1.2.1] in both vehicle and home embodiments.

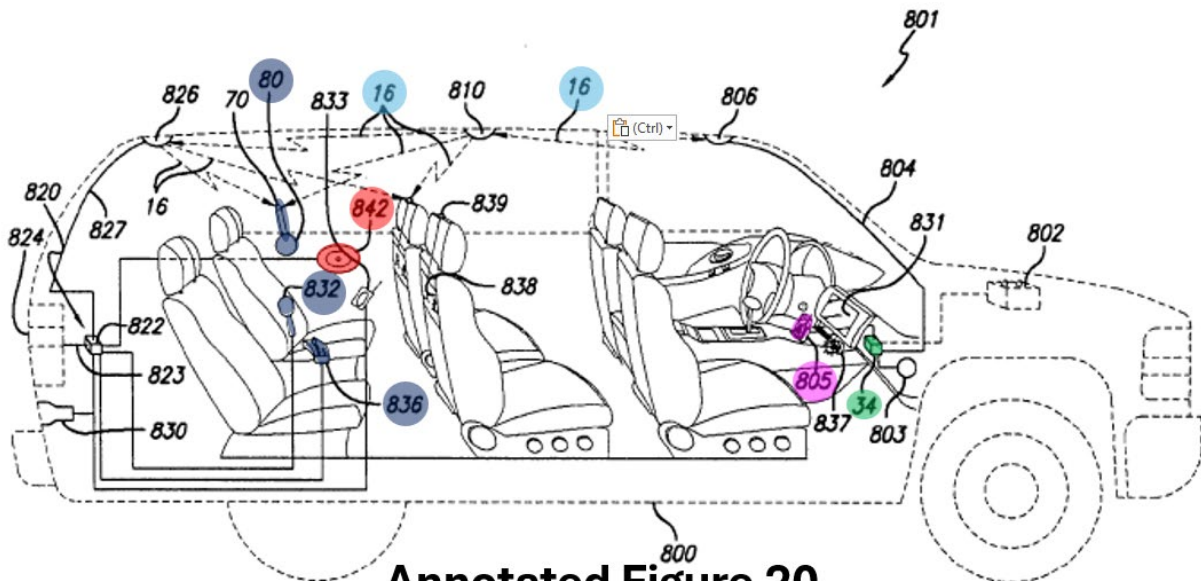
In the vehicle embodiment, Richenstein discloses that after audio device 34 (“*first playback device*”) receives commands from game controllers 836/936 (“*receiving control information*”), audio device 34 receives “a voice stream” or “audio and video data” (“*the audio information*”) from cellular telephone 805 (“*audio information source outside the LAN*”). EX1005, [0146], [0153], [0161], [0165]-[0166]; EX1003, ¶¶155, 157-159.

In the home embodiment, Richenstein discloses that after home theatre system 1100 receives commands from PC 1060 (“*receiving control information*”), home theatre system 1100 (“*first playback device*”) obtains “television and audio programming” (“*the audio information*”) from cable television network 1022 or the Internet (“*audio information source outside the LAN*”). EX1005, [0041], [0167], [0174]-[0176]; EX1003, ¶¶156, 157-159.

5. **Richenstein discloses [1.2.2] (ii) transmitting, by the first playback device to a second playback device, the audio information, playback timing information associated with the audio information, and device clock information of the first playback device; and**

Richenstein discloses element [1.2.2] in both vehicle and home embodiments.

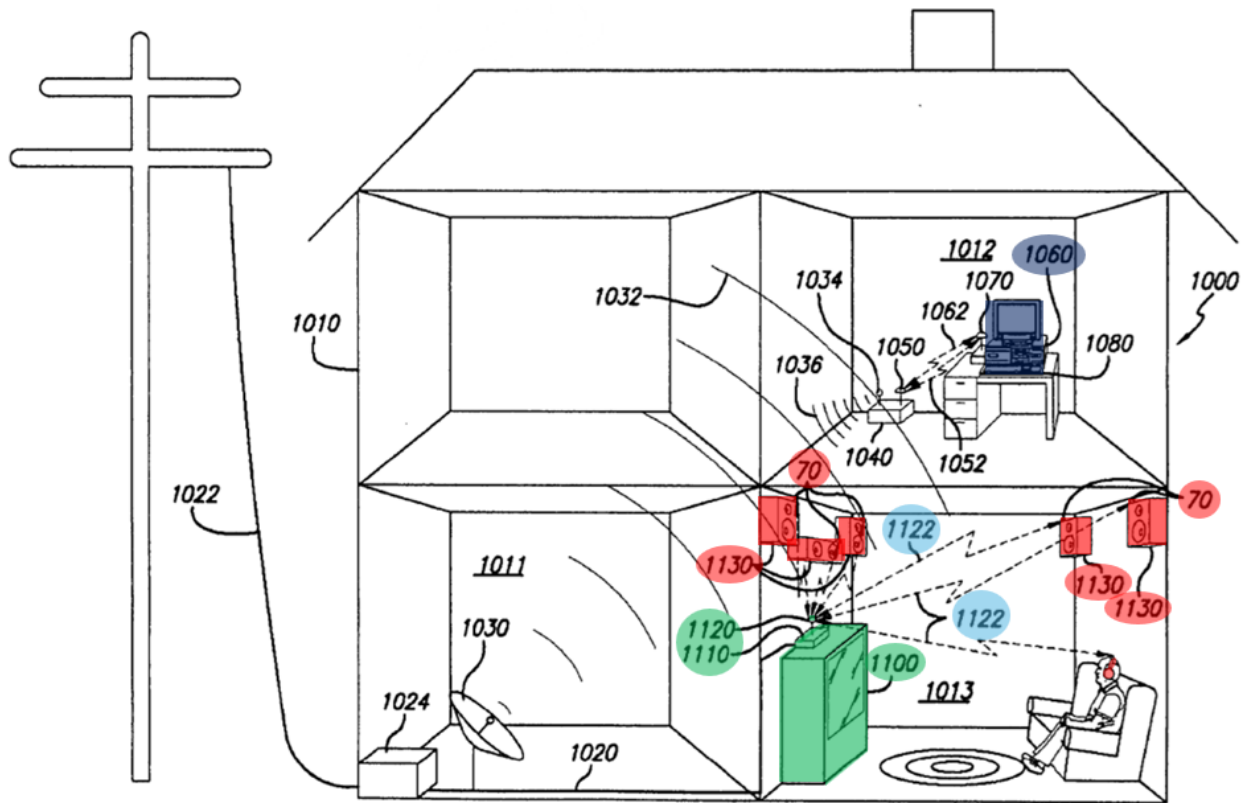
In the vehicle embodiment of Figs. 20/21, Richenstein discloses audio device 34 (“*first playback devices*”), shown in green, with transmitter 806 for transmitting audio data signals 16, shown in light blue (“*transmitting . . . the audio information*”) to speakers 842/940 (“*a second playback device*”), shown in red. EX1005, [0146] (audio device 34 encodes “a voice stream from the telephone for IR transmission”), [0144] (842 receives IR signals 16), [0164] (940 receives encoded audio data through IR receiver/transmitter). See EX1003, ¶164.



**Annotated Figure 20**

EX1003, ¶164 — EX1005, FIG. 20 (Annotated)



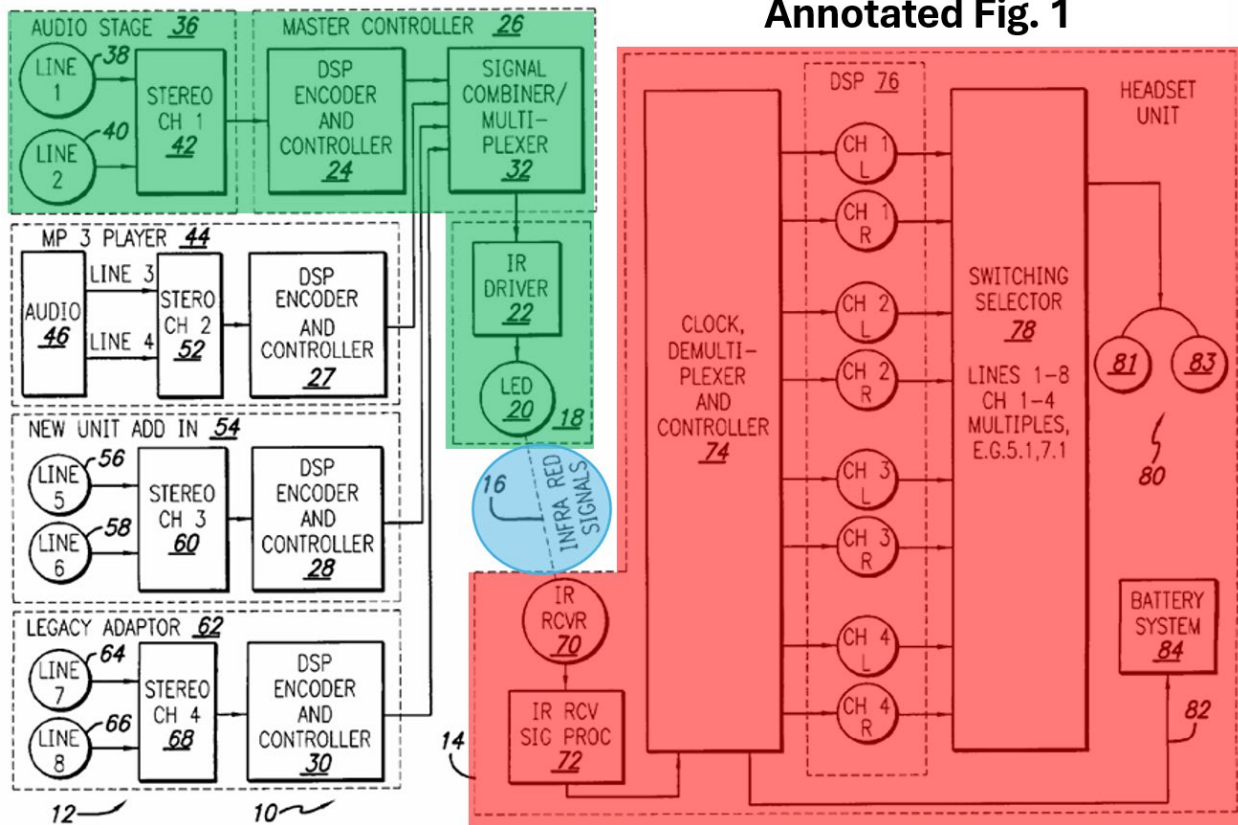


**Annotated Figure 23**

**EX1003, ¶165 — EX1005, FIG. 23 (Annotated)**

Vehicle speakers 842/940 and home speakers 1130 and headset 14 are receiving devices that decode received audio data and further outputs it to produce sound. EX1005, [0007], [0042], [0049], Fig. 1 (headset 14 shown in red). These devices on the receiving end are therefore also playback devices (each “*a second playback device*”). EX1003, ¶166.

**Annotated Fig. 1**

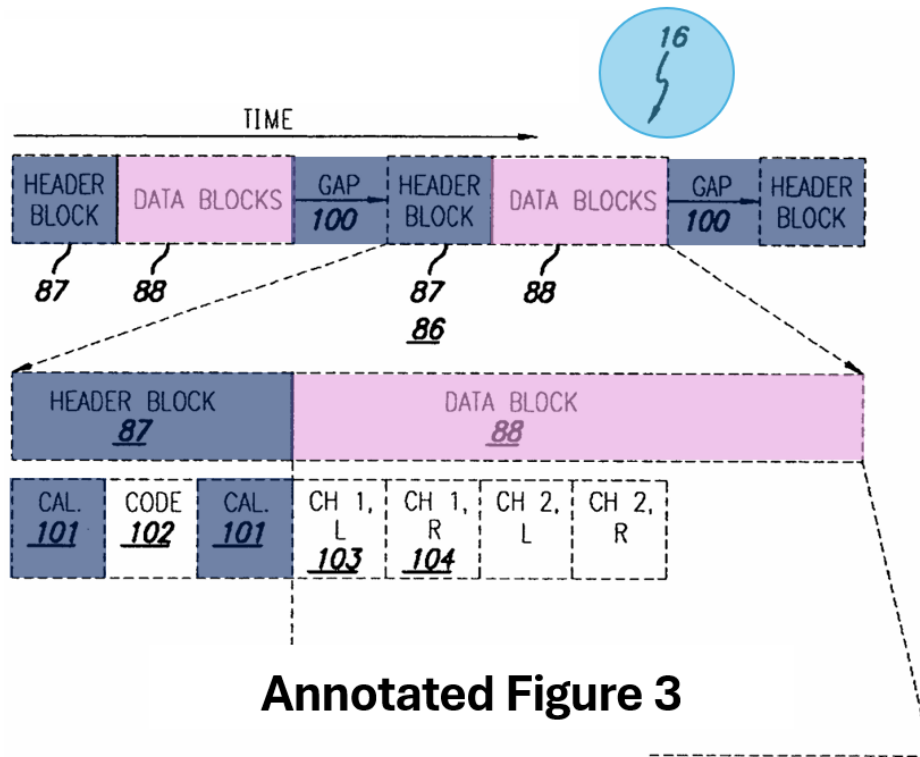


**EX1003, ¶166 — EX1005, FIG. 1 (Annotated)**

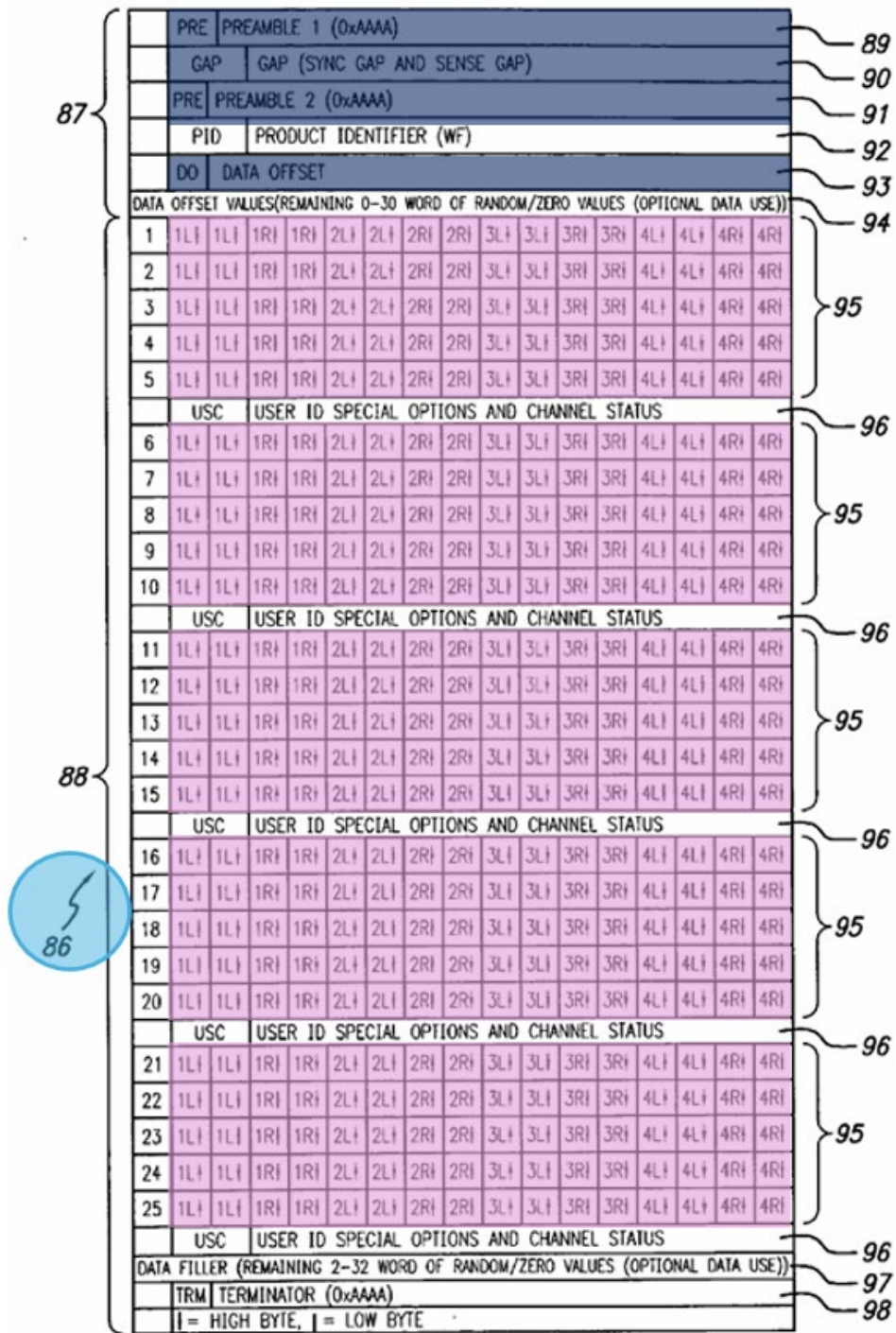
Audio devices 34 transmit signals 16 or 1122 containing audio content such as “a voice stream” or “television and audio programming” (“*audio information*”) along with its “timing information” used by the receiving device “to synchronize the timing of the operations” (“*playback timing information*”) and its clock information used by the receiving device to reproduce audio device 34’s clock, e.g., information used by clock recovery circuit 716 (“*device clock information of the first playback device*”). EX1005, [0052]-[0053], [0057], [0146], [0176]; EX1003, ¶¶167-178.

Richenstein discloses exemplary packets 86 in signals 16 (and signals 1122),

formatted specifically for achieving synchronization in audio system 10, as shown in Figs. 3 and 12 (annotated below). EX1005, [0052]-[0053], [0057], [0066]. “Transmitted signals or packets 86 may conveniently be partitioned into two sections, header section 87 and data section 88.” EX1005, [0054]. The audio information data is contained in data blocks 88 (pink), and synchronizing timing information are provided in one or more of fields including header sections 87 and gaps 100/90 (Fig. 3), preambles 89 and 91, and offset 93 (Fig. 12), all in dark blue. EX1005, [0055]-[0057]; EX1003, ¶171.



EX1003, ¶171 — EX1005, FIG. 3 (Annotated)



**Annotated Fig. 12**

EX1003, ¶171 — EX1005, FIG. 12 (Annotated)

Richenstein specifically discloses “timing information” included within IR signals 16 to “synchronize the timing of the [playback] operations of” a receiver to a transmitter. EX1005, [0066]. For example, each “header section 87,” preceding each data section 88, may include one or more calibration sections 101 that may provide, among other things, “timing data,” indicating when the audio information in data section 88 is to be played back. EX1005, [0057]; EX1003, ¶¶171-73. Richenstein also discloses “sync signals” in the IR data that is detected by synch detector 112, including, e.g., “trailing edge of data section 88.” EX1005, [0067]; EX1003, ¶180. This is also consistent with the use of timestamps as “*playback timing information*” in the MOST standard that Richenstein expressly discloses to implement its embodiments. EX1005, [0171]; EX1008, 177 (timestamps for events and triggering conditions); EX1003, ¶¶102-104. Therefore, Richenstein’s IR data transmitted by audio device 34 includes the “*playback timing information associated with the audio information.*”

In addition, transmitting device 500 uses a “Clocks and Clock Phasing” circuitry 628 including several device clocks 660-663. EX1005, 84, Fig. 8. Specifically, “master clock” 660 has a “stand-alone crystal oscillator circuit” and drives clock signal for multiplexer(s) 606 and 608 and DSP 600, sampling, and organization of audio information in Figs. 3 and 12. *Id.*; see also EX1003, ¶173.

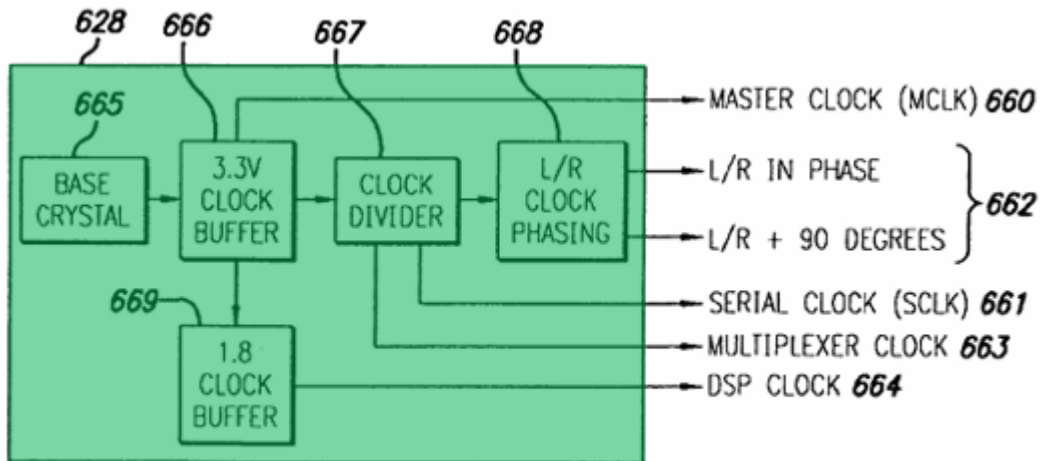


FIG. 8

**EX1003, ¶91 — EX1005, FIG. 8 (Annotated)**

Receiver 700 has a clock recovery circuit 716 “used to reproduce the data clock used by transmitter 500” with the clock information carried by the PPM IR data (“*device clock information*”). EX1005, [0118]-[0121], [0132] (transmitter clock (CLKX)), Figs. 15 and 16. Using such clock recovery methods, “the incoming data clock is recovered continuously by receiver 500 as the incoming data packets are processed.” EX1005, [0119]. A POSITA would recognize that information about audio device 34’s clock is provided as time values, e.g., contained in the headers and/or gaps (“*useful to convey clocking information*”). EX1005, [0053], [0109]; EX1003, ¶175. Accordingly, Richenstein discloses the transmission of “*clock information of the first playback device.*” EX1003, ¶¶175-179.

6. **Richenstein discloses [1.2.3] (iii) playing back, by the first playback device, the audio information in synchrony with the second playback device by using the playback timing information associated with the audio information and the device clock information of the first playback device to play back the audio information,**

Audio device 34 is a playback device. *Supra*, Section V.B.2. EX1003, ¶¶135-37. Richenstein emphasizes the importance of synchronization in playback timing between audio device 34 and the receiving playback devices, explaining that multiple device playback without synchronization degrades audio quality. EX1005, [0066]-[0068]. Richenstein addresses this synchronization need by having audio device 34 or home theater system 1100 (“*first playback device*”) and receiving playback devices (each a “*second playback device*”) play the same audio information *in synchrony* using the playback timing information and audio device 34’s device clock information, as explained above. EX1003, ¶¶169-178, 180-83. To the extent playing in synchrony requires simultaneous play, Richenstein discloses or suggests simultaneous playback between audio device 34 or home theater system 1100 and other IR playback devices. *See e.g.*, EX1005, [0146] (“passengers to converse on the telephone via audio device 34 and other IR devices”), Figs. 19-23 (showing various vehicle infotainment and home entertainment settings for simultaneous and synchronous playback between audio devices 34/1100 and respective receiving speakers 842/940, headsets 14, or speakers 1130); EX1003, ¶¶180-83.

**7. Richenstein discloses [1.2.4] wherein the first and second playback devices remain independently clocked during synchronous playback of the audio information.**

Both audio device 34 (“*first playback device*”) and receiving device 700, e.g., speakers 842/940 and 1130 (“*second playback device*”), operate according to their own oscillator crystals, circuits, and clocks. EX1005, [0119] (receiver Voltage Controlled Oscillator), Fig. 8 (base crystal 665); EX1003, ¶186. Richenstein also discloses using “PLL” to maintain synchronization between independent oscillators, clocking circuits, and clocks. EX1005, [0068], [0119]; EX1003, ¶186. Accordingly, Richenstein discloses “*independently clocked*” playback devices. *See* EX1003, ¶¶184-188.

Therefore, Richenstein anticipates or at least alone renders obvious claim 1.

**C. Dependent Claim 2: The method of claim 1, further comprising: after receiving the control information, additionally (i) generating, by the first playback device, the playback timing information associated with the audio information; and (ii) generating, by the first playback device, the device clock information of the first playback device.**

Audio device 34 encodes IR data into packets (“*generating*”) and as explained regarding element [1.2.2], Such encoded IR data includes playback timing information and device clock information. EX1005, [0052]; *Supra*, Section V.B.5. Richenstein further discloses “clocks and clock phasing” circuit 628 to create (“*generating*”) the timing and synchronization necessary for audio signal

transmission. EX1005, Figs. 7-8, [0080]-[0086]; EX1003, ¶¶189-92.

**D. Dependent Claim 3: The method of claim 1, wherein the control information further comprises one or more instructions for the first playback device and the second playback device to playback audio information.**

As described regarding element [1.1.1], Richenstein discloses controlling media playback of audio device 34 and various other playback devices in its vehicle embodiment of Fig. 20/21. EX1005, [0149], [0153], [0165]- [0166]; *Supra*, Section V.B.2. Richenstein also discloses controlling the home theater system to playback using complex audio formats, including 5.1 or 7.1 EX1005, [0176]. It was well-known to POSITA that 5.1 and 7.1 formats require 5 and 7 synchronized speakers respectively, each requiring instruction to play back the audio information according to its specific format. Accordingly, Richenstein discloses instructions to playback on first and second audio devices. EX1003, ¶¶193-97.

**E. Dependent Claim 8:**

- 1. [8.P]: A tangible non-transitory computer-readable medium having instructions stored thereon that, when executed, cause a first playback device to:**

Richenstein discloses the use of processors and computer-readable media in audio device 34, including at least exemplary boot memory 630 storing “software controlling the DSP,” read-only-memory (ROM) providing DSP software, and programming for master controller 26 to execute. EX1005, [0037], [0083], [0125]; EX1003, ¶¶253-60.

2. **[8.1.1]: receive, from a network device configured to control the first playback device and communicatively coupled to the first playback device over a local area network (LAN), control information comprising an address identifying a location of audio information available at an audio information source, [8.1.2] wherein the audio information source is outside of the LAN; and [8.2.1]: after receiving the control information, (i) obtain, from the audio information source outside of the LAN, the audio information; [8.2.2] (ii) transmit, to a second playback device, the audio information, playback timing information associated with the audio information, and clock time information for the first playback device; and [8.2.3] (iii) play back the audio information in synchrony with the second playback device by using the playback timing information associated with the audio information and the clock time information of the first playback device to play back the audio information, [8.2.4] wherein the first and second playback devices remain independently clocked during synchronous playback of the audio information**

Richenstein discloses or suggests elements [8.1.1]-[8.2.4], which are substantively the same as elements [1.1.1]-[1.2.4]. *Supra*, Sections V.B.2-7; *see also* EX1003, ¶¶259-261.

Thus, Richenstein anticipates or at least alone renders obvious claim 8.

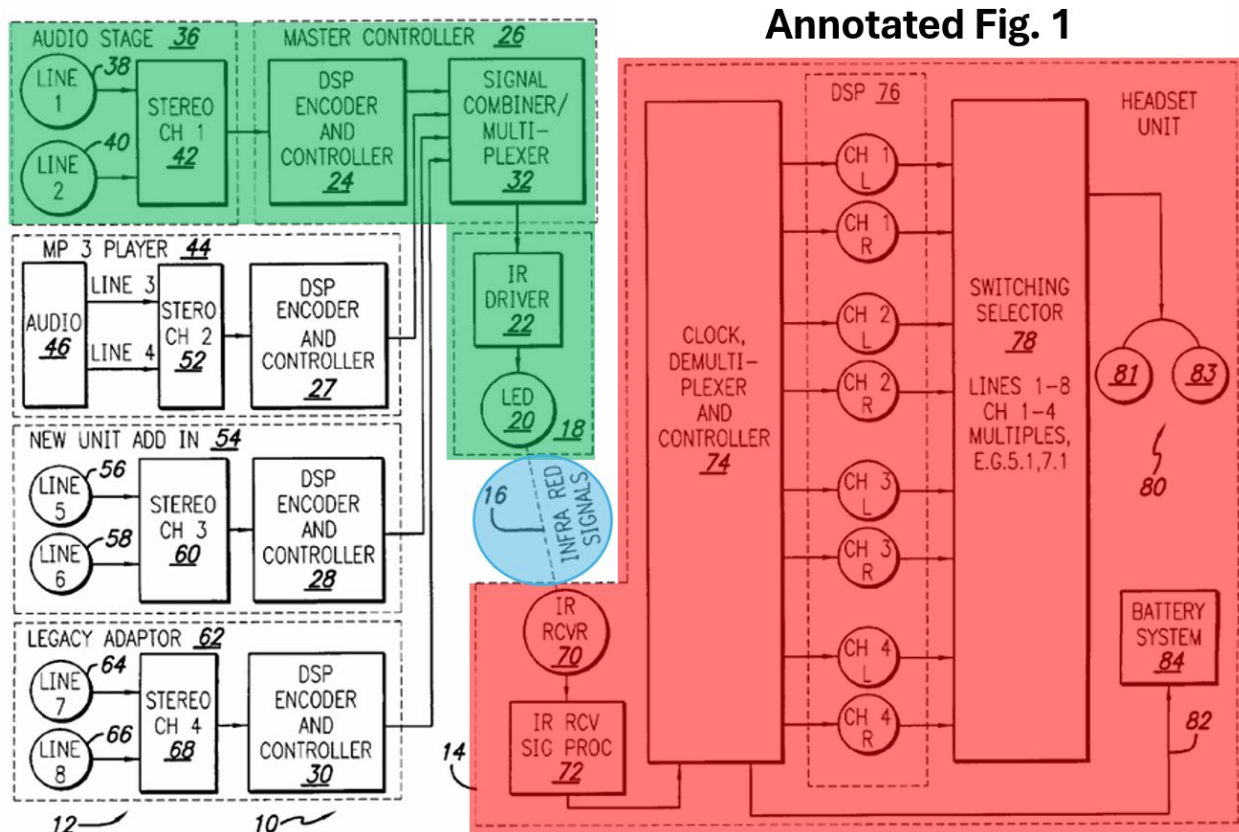
#### **F. Independent Claim 9:**

1. **[9.P]: A first playback device comprising:**

As disclosed for element [1.1.1], Richenstein discloses embodiments of audio device 34 (“*first playback device*”) in Figs 20/21 for vehicles and in Fig. 23 for a home. *Supra*, Section V.B.2; *see also* EX1003, ¶¶262-263.

2. [9.1]: one or more processors;

As described above regarding element [8.P], audio device 34 includes at least processors master controller 26 including DSP encoder and controller 24, the signal combiner/multiplexer 32. EX1005, [0035]-[0038], Fig. 1; EX1003, ¶264.



EX1003, ¶264 — EX1005, FIG. 1 (Annotated)

3. [9.2]: a network interface; and

For each of audio device 34 and home theatre system 1100, Richenstein discloses a network interface. See EX1003, ¶¶ 267-271. For example, each IR module in the audio device 34 includes an interface circuitry such as a “network interface card” to support communication with a vehicle databus. EX1005, [0172];

EX1003, ¶¶268-70. Richenstein further discloses a LAN network with wired or wireless connections according to 802.11 (WiFi). Home theater system 1100 may be equipped with an IR transmitter/receiver and “connected to network 1020 to receive television and audio programming.” EX1005, [0176]. In order for a device to connect to LAN network 1020, it necessarily includes a network interface. EX1005, [0173] (generally disclosing “device can be equipped with an IR transmitter/receiver that allows the device to connect to the network through one of the wireless interfaces”); EX1003, ¶¶265-72.

4. **[9.3]: tangible, non-transitory computer-readable memory comprising program instructions that, when executed by the one or more processors, cause the first playback device to:**

Richenstein discloses element [9.3] for the same reasons provided for element [8.P]. *Supra*, Section V.E.1; *see also* EX1003, ¶¶273-74.

5. **[9.3.1]: receive, via the network interface from a network device configured to control the first playback device and communicatively coupled to the first playback device over a local area network (LAN), control information comprising an address identifying a network location of audio information available at an audio information source, wherein the audio information source is outside of the LAN; and [9.3.2]: after receiving the control information, (i) obtain, via the network interface from the audio information source outside of the LAN, the audio information; (ii) transmit, via the network interface of the first playback device to a second playback device, the audio information, playback timing information associated with the audio information, and device clock information of the first playback device; and (iii) play back the audio information in synchrony with the second playback device by using the playback timing information associated with the audio information and the device clock information of the first playback device to play back the audio information, wherein the first and second playback devices remain independently clocked during synchronous playback of the audio information.**

Richenstein discloses or suggests elements [9.3.1]-[9.3.2], which are substantively the same as elements [1.1.1]-[1.2.4]. *Supra*, Section V.B.2-7; *see also* EX1003, ¶¶275-277.

Thus, Richenstein anticipates or at least alone renders obvious claim 9.

- G. Dependent Claim 10: The first playback device of claim 9, wherein the program instructions, when executed by the one or more processors, further cause the first playback device to: generate the playback timing information associated with the audio information; and generate the device clock information of the first playback device.**

Richenstein discloses or suggests claim 10, which is substantively the same as claim 2. *Supra*, Section V.C; *see also* EX1003, ¶¶278-279.

- H. Dependent Claim 11: The first playback device of claim 9, wherein the control information further comprises one or more instructions for the first playback device and the second playback device to playback audio information.**

Richenstein discloses or suggests claim 11, which is substantively the same as claim 3. *Supra*, Section V.D; *see also* EX1003, ¶¶280-281.

- I. Dependent Claim 18: The first playback device of claim 9, wherein the audio information comprises one of audio files or packetized streaming audio information.**

As described regarding element [1.1.1], Audio devices 34 obtain audio from outside of their local network. *Supra*, Section V.B.2. Audio sources include MP3 players, CD players, DVD players, satellite radio stations, cellular telephones, and cable network television and music channels. EX1005, [0037], [0161], [0174]-[0176]; *see also* EX1003, ¶305. MP3, CDs, and DVDs store audio data in files (“*audio files*”), while satellite radio stations, cellular telephones, and cable network media provide streams of data packets (“*packetized streaming audio information*”). EX1003, ¶¶304-310.

- J. Dependent Claim 19: The first playback device of claim 9, wherein the audio information source outside of the LAN is an Internet-accessible audio information source, and wherein obtaining, from the audio information source outside of the LAN, the audio information, comprises obtaining the audio information from the Internet-accessible audio information source.**

As described for elements [1.1.1]-[1.1.2], audio devices 34 obtain audio information from audio sources such as cellular phone 805 and via cable network 1022 or the Internet. *Supra*, Section V.B.2-3. A POSITA would recognize that cellular telephone 805 inherently had Internet capabilities via the “General Packet Radio Service” including the ability to access audio content online (“*Internet-accessible audio information source*”). EX1003, ¶315. Further, home theater system 1100 is “connected to network 1020 to receive television and audio programming” from cable network 1022 or the Internet via cable modem 1024 (“*Internet-accessible audio information source*”). EX1005, [0174]-[0176]; EX1003, ¶316.

Thus, each embodiment in Richenstein provides the accessibility of media stored on the Internet, *i.e.*, “*obtaining the audio information from the Internet-accessible audio information source.*” EX1003, ¶¶311-316.

- K. Dependent Claim 20: The first playback device of claim 9, wherein obtaining, from the audio information source outside of the LAN, the audio information, comprises sending, to the audio information source, a request for the audio information.**

As described for elements [1.1.1]-[1.1.2], audio devices 34 obtain audio information from audio sources such as cellular phone 805 and via cable network

1022 or the Internet. *Supra*, Section V.B.2-3. A POSITA would know that “request and response” interactions are a basic networking activity and making requests for certain audio from sources before receiving is therefore inherent to Richenstein’s disclosure. EX1003, ¶¶319-322. Richenstein also discloses the use of requests to obtain desired content. EX1005, [0166] (audio device 34 requests telemetry data from CPU 924); [0171] (controller 836/936 requests specific CD’s from CD changer 950); [0146], [0161], [0165]-[0166] (requesting cellular telephone initiate/accept a call). *See* EX1003, ¶¶323-324. A POSITA would accordingly understand Richenstein’s playback device sends an audio information source a request for the audio information. EX1003, ¶¶318-326.

**VI. GROUNDS 1-3: RICHENSTEIN ANTICIPATES OR RENDERS OBVIOUS CLAIMS 4-7 AND 12-17 ALONE OR IN VIEW OF MOST-2.0.**

**A. Overview of MOST-2.0 (EX1008)**

Richenstein references MOST, a communications standard for fiber optic networks, and MOST-2.0 is a standardization document describing MOST contemporaneous with Richenstein. EX1005, [0171]; EX1003, ¶99. MOST-2.0 provides a specification for a network of up to 64 devices, each comprised of functional areas such as MOST<sub>Transceiver</sub>, Crystal, and PLL-Filter. EX1008, 13, 166; EX1003, ¶¶189-92, 101-103. Each device fills one or more roles of MMI (providing user control), master (providing master clock timing), and slave (executing

commands). EX1008, 15. Each device can be identified individually as an “InstanceID” or as a group with a “DeviceID.” EX1008, 29, 31. MOST-2.0 further describes MMI as a “Network Master” that stores and updates configuration status entries for each device. EX1008, 113-116.

MOST-2.0 discloses grouping devices and assigning one as a group controller and the remaining as group slaves, and the group controller transmits these device assignments to the MMI. EX1008, 15 (assigning function groups), 24 (assigning group controller), 25 and Table 2-1 (device class ranking states); EX1003, ¶¶211-13.

Class	Ranking
Slave	0
Controller	1
System Controller	2
MMI	3

Table 2-1: Ranking of device classes

MOST-2.0 further discloses MMI’s and controllers may request devices to identify their function rankings, and controllers may optionally pass the summarized information along to the MMI. EX1008, 24-25, Fig. 2-10; *see also* EX1003, ¶¶212-214.

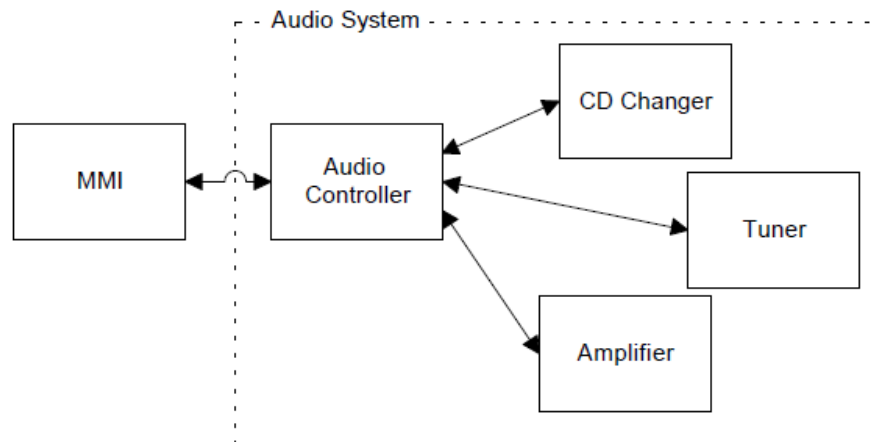


Figure 2-10: Delegation of functions of all audio components to one audio controller

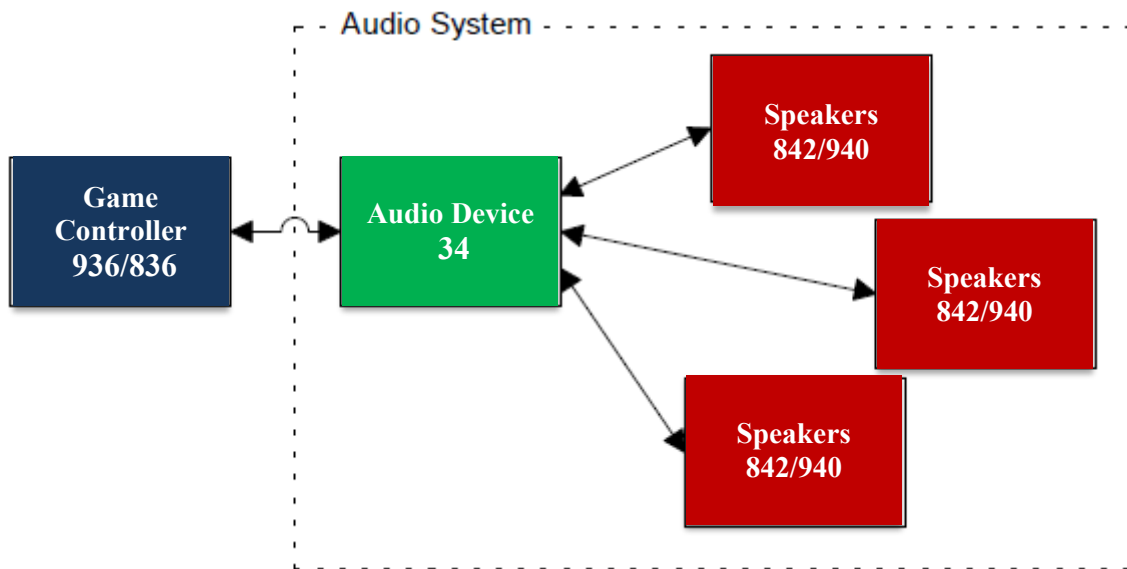
MOST-2.0 further describes the master as a “timing master,” which generates and transmits its clock information to set the bus time (system clock), and slaves are phase- and frequency-locked to the master’s clock through the bitstream from the bus. EX1008, 84, 87, 94; EX1003, ¶¶102-103.

### **B. Richenstein and MOST-2.0**

Richenstein provides networked audio systems including multiple playback devices that synchronously play audio content, and Richenstein specifically discloses that the systems may operate according to the MOST standard. EX1005, [0171]; EX1003, ¶¶127-29. Therefore, Richenstein inherently discloses its audio devices 34 and receiving playback devices to implement MOST’s master-slave configuration for transmitting audio data and master’s clock time information, and its controller devices to implement MOST’s MMI function for controlling other devices on the network. EX1003, ¶¶213-17.

To the extent Richenstein does not disclose implementation specifics using

MOST, a POSITA would have found such implementation obvious given Richenstein's specific teaching to use MOST and the POSITA's knowledge and familiarity with the MOST standard, such as documented in MOST-2.0, at the time. EX1005, [0171]; EX1044, 5:12-13; EX1003, ¶¶100, 128-129. For example, a POSITA would understand Richenstein's vehicle audio network embodiments implementing MOST would have the devices similarly connected in a configuration as annotated by Dr. Hartpence below. EX1003, ¶¶213-16.



**EX1003, ¶215 — EX1008, FIG. 2-10 (Annotated)**

A POSITA would have found ample reasons to combine Richenstein and MOST-2.0: Richenstein's express teaching, suggestion, and motivation to use MOST standard and that MOST-2.0 was the specification publicly available at the time; Richenstein and MOST-2.0 are in the same field of endeavor and solving same

problems of synchronizing playback over a network; a reasonable expectation that Richenstein will be successfully modified to yield a predictable result using the standard specified by MOST-2.0. EX1003, ¶¶128-129.

**C. Dependent Claim 4: The method of claim 3, wherein the first and second playback devices are members of a synchrony group, and wherein the method further comprises: transmitting, by the first playback device to the network device, status information that comprises a status of the synchrony group.**

As discussed for element [1.2.3], a “*first playback device*” audio device 34/1100 plays back audio in synchrony with a “*second playback device*,” speaker 842/940 and speakers 1130 in the vehicle and home embodiments, respectively. *Supra*, Section V.B.6. A POSITA would understand that these devices used to playback synchronized audio constitute a “*synchrony group*.” EX1003, ¶¶199-200.

Richenstein further discloses the audio device 34 (“*first playback device*”) transmitting data and information about system devices (“*status information*”) to user control devices (“*network device*”). EX1005, [0166] (requesting telemetry data from vehicle CPU through audio device 34 using controller 836), [0166] (information and feedback from phone, through audio device 34 to controller 836); EX1003, ¶¶201-203. Commands from game controller 836 inherently require responses from the target devices to provide state knowledge, including switching CD’s on CD changer 950, DVD playback control, and video game play. EX1005, [0153], [0162], [0166]; EX1003, ¶204. Richenstein therefore discloses audio device

34's transmission of status information to the controllers, including the status of grouped audio device 34 and speakers 842 or 1130 ("*status of the synchrony group*"). EX1003, ¶¶205-209.

Richenstein further discloses audio device 34 transmitting status information through its reference to MOST. EX1001, [0171]; *Supra*, Section VI.B. Specifically, a POSITA would understand, implementing the MOST standard (as specified by MOST-2.0), Richenstein would group devices, such as audio device 34 and speakers 842 and 1130, ("*first and second playback devices*"), and assign audio device 34 as a group controller, and the remaining as group slaves, and transmit device assignments or function rankings ("*status information that comprises the status of the synchrony group*") to the controllers ("*network device*"), implementing MMI or "interface." EX1008, 15 (assigning function groups), 24 (assigning group controller), 25 (requesting devices to identify their function rankings) and Table 2-1 (device class ranking states); EX1003, ¶213-21.

Class	Ranking
Slave	0
Controller	1
System Controller	2
MMI	3

Table 2-1: Ranking of device classes

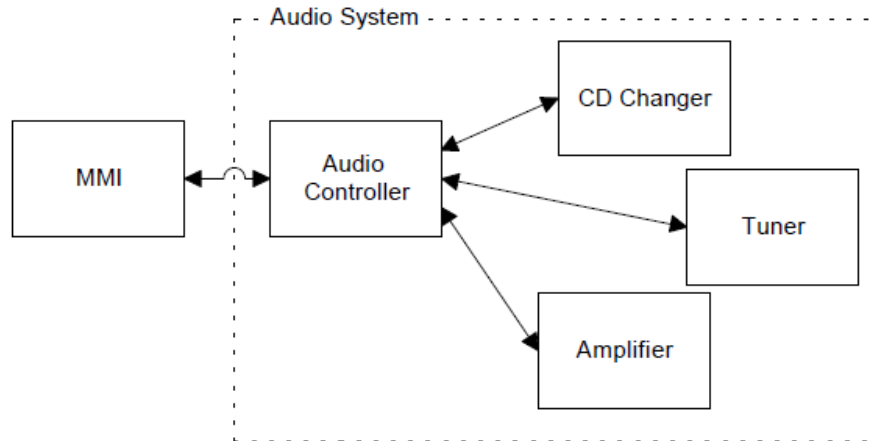
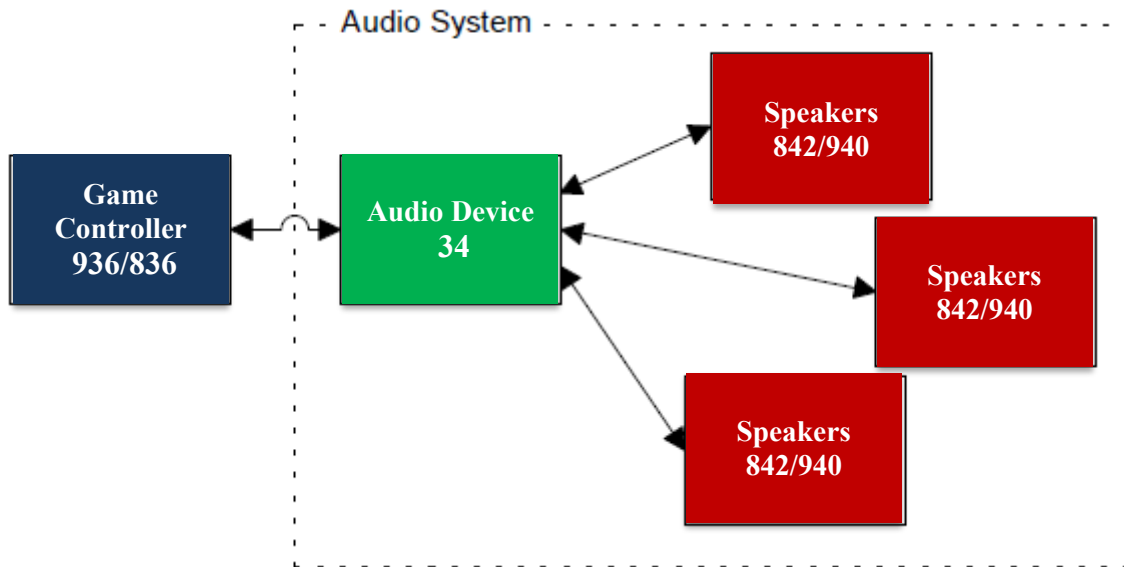
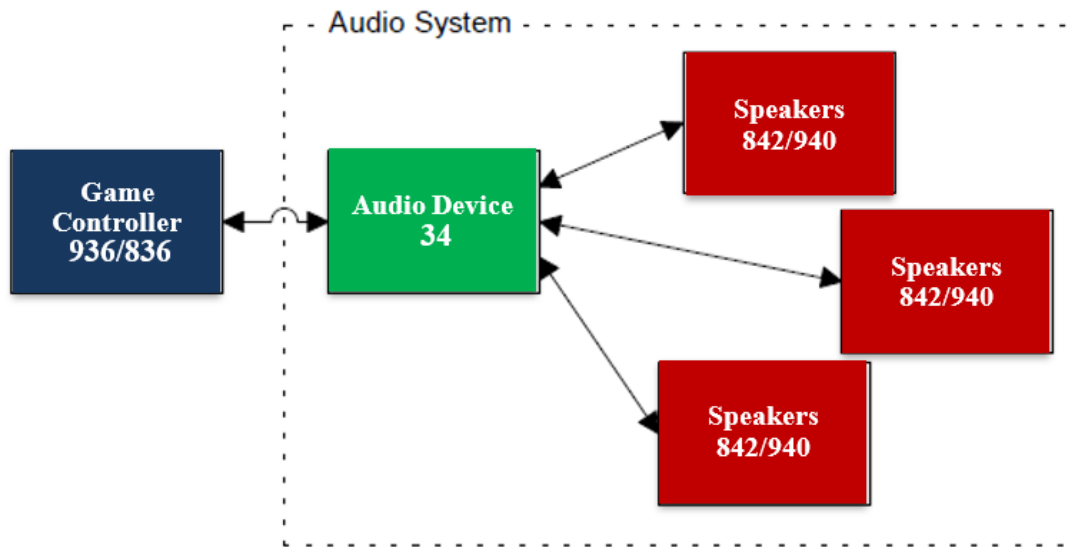


Figure 2-10: Delegation of functions of all audio components to one audio controller



**EX1003, ¶215 — EX1008, FIG. 2-10 (Annotated)**

A POSITA would similarly recognize Richenstein's home entertainment embodiments of Fig. 23 to align with the following structure:



**EX1003, ¶216 — EX1008, FIG. 2-10 (Annotated)**

To the extent it is not disclosed or suggested by Richenstein alone, a POSITA would have been motivated to implement the transmission of status information Richenstein according to MOST-2.0 to achieve Richenstein’s desired functions of providing a user-controllable audio network and for all reasons explained in Section VI.B. EX1003, ¶218-19. Because transmitting status information is straightforward, routine, and easy to implement to a POSITA, a POSITA would have a reasonable expectation that modification of Richenstein using the status information disclosed by the MOST standards would succeed and yield predictable result. EX1003, ¶219-20.

**D. Dependent Claim 5: The method of claim 4, wherein the status information further comprises an identification of each playback device in the synchrony group.**

As described above for claim 4, Richenstein discloses, alone or with MOST-2.0, transmitting “*status information.*” *Supra*, Section VI.C. Further, Richenstein repeatedly discloses the importance of identifying individual devices within the audio network. EX1005, [0173] (unique device identification for routing data); [0169] (unique device identification for customized settings). A POSITA would recognize individual device identification’s importance would increase as the system grew, as likelihood of incorrectly identifying a device may increase. EX1003, ¶226. A POSITA would further recognize receiving feedback from individual devices would improve troubleshooting and user experience. EX1003, ¶¶226-27; EX1005, [0156].

As further explained regarding claim 4, MOST-2.0’s status information identifies each group device as slave, controller, system controller, or MMI. *Supra*, Section VI.C. A POSITA would be motivated to implement MOST-2.0 to include device identifications in Richenstein’s status information and would have a reasonable expectation of success in doing so, for reasons explained in Section VI.B. EX1003, ¶¶228-30.

**E. Dependent Claim 6: The method of claim 5, wherein the status information further comprises an identification of a master playback device of the synchrony group.**

As explained regarding claim 5, Richenstein discloses, alone or with MOST-2.0, transmitting “*status information*” that uniquely identifies the operating status of each grouped device of the synchrony group. *Supra*, Section VI.D.

As described regarding element [1.2.2], Richenstein discloses a synchronization method where each receiving device operates according to the transmitting device’s master clock. *Supra*, Section V.B.5. A POSITA would understand the device with the master clock to constitute a “*master playback device*” and that such a role would be important for user control, reallocation, calibration, etc. EX1003, ¶¶232-243; EX1005, [0061].

As described regarding claims 4 and 5, Richenstein discloses implementing MOST’s function groups with roles of “group controller” and “slave,” which indicates the controller’s status as a “master” within the group. EX1008, 24-25; EX1003, ¶¶239-40. Accordingly, the audio device 34 (“*first playback device*”), functioning as a “group controller,” would have been identified as the “*master playback device of the synchrony group.*” *Supra*, Sections VI.C-D; EX1003, ¶240.

For the same reasons identified for claims 4 and 5, even if Richenstein does not disclose or suggest its implementation according to MOST-2.0, a POSITA would have been motivated towards their combination with a reasonable expectation of

success based on predictable results. *Supra*, Sections VI.C-D.; EX1003, ¶241.

**F. Dependent Claim 7: The method of claim 6, wherein the first playback device is the master playback device of the synchrony group.**

As explained for claim 6, Richenstein discloses or suggests, alone or in view of MOST-2.0, that “*first playback devices*,” audio device 34 is the master playback device. *Supra*, Section VI.E; *see also* EX1003, ¶¶244-251.

**G. Dependent Claim 12: The first playback device of claim 11, wherein the first and second playback devices are members of a synchrony group, and wherein the program instructions, when executed by the one or more processors, further cause the first playback device to: transmit, to the network device, status information that comprises a status of the synchrony group.**

Richenstein discloses or suggests claim 12 alone or in view of MOST-2.0, which is substantively the same as claim 4. *Supra*, Section VI.C; *see also* EX1003, ¶¶282-283.

**H. Dependent Claim 13: The first playback device of claim 12, wherein the status information further comprises an identification of each playback device in the synchrony group.**

Richenstein discloses or suggests claim 13 alone or in view of MOST-2.0, which is substantively the same as claim 5. *Supra*, Section VI.D; *see also* EX1003, ¶¶284-285.

**I. Dependent Claim 14: The first playback device of claim 12, wherein the status information further comprises an identification of a master playback device of the synchrony group.**

Richenstein discloses or suggests claim 14 alone or in view of MOST-2.0, which is substantively the same as claim 6. *Supra*, Section VI.E; *see also* EX1003, ¶¶286-287.

**J. Dependent Claim 15: The first playback device of claim 14, wherein the first playback device is the master playback device of the synchrony group.**

Richenstein discloses or suggests claim 15 alone or in view of MOST-2.0, which is substantively the same as claim 7. *Supra*, Section VI.F; *see also* EX1003, 288-289.

**K. Dependent Claim 16: The first playback device of claim 12, wherein the status information further comprises an identification of one or more slave playback devices in the synchrony group, and wherein the second playback device is one of the one or more slave playback devices in the synchrony group.**

As explained regarding claims 6-7, Richenstein alone or in view of MOST-2.0 provides audio device 34 as a master timing device in command of receiving devices 842/940 and 1130 for synchronized playback. *Supra*, Sections VI.E-F. These receiving devices (“*second playback devices*”) are therefore “*slave*” devices. EX1003, ¶¶290-95. As further described regarding claim 6, a POSITA would understand the roles of receiving devices 842/940 and 1130 as “*slaves*” to be important status information. EX1003, ¶¶292-94.

- L. Dependent Claim 17: The first playback device of claim 16, wherein the instructions, when executed by the one or more processors, further cause the first playback device to: generate a plurality of frames, wherein an individual frame comprises at least a portion of the audio information and the playback timing information associated with the audio information, and wherein the first playback device transmitting to the second playback device the audio information, playback timing information, and device clock information of the first playback device comprises transmitting the plurality of frames to the second playback device.**

Richenstein describes transmitting formatted digital audio streams. EX1005, Abstract. Richenstein discloses the use of frames throughout its disclosure including “frame synchronization” for digitized audio streams, using its clock “to frame the data into distinct audio samples,” and employing a “dual-phase frame.” EX1005, [0109], [0131]-[0133], [0090], [0135]. A POSITA would understand frames as a common audio format that are generated when audio device 34 generates the packets for the digitized audio streams. EX1003, ¶¶296-99. Accordingly, a POSITA would understand Richenstein to disclose transmitting its digital audio streams as “*a plurality of frames.*” EX1003, ¶¶296-302.

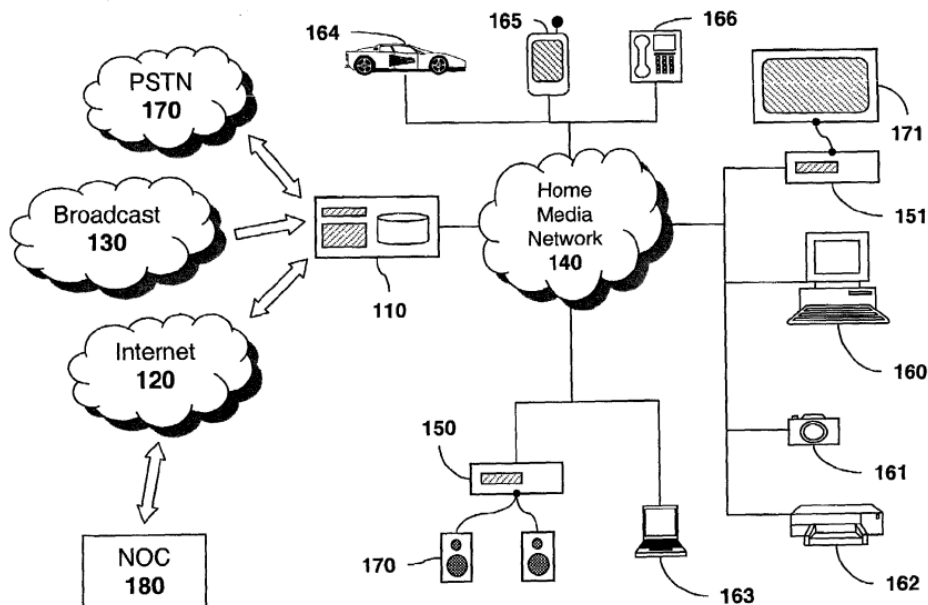
As further detailed regarding claim 2, Richenstein discloses that audio devices 34 generate audio streams including “*audio information and associated playback timing*” to speakers 842/940 and 1130 (“*second playback devices*”). *Supra*, Section V.C. A POSITA would understand that Richenstein’s frames include “*at least a portion of the audio information and the playback timing information associated*

with the audio information.” EX1003, ¶301.

**VII. GROUNDS 4-5: CHATTERTON ANTICIPATES OR RENDERS OBVIOUS CLAIMS 1-20.**

**A. Overview of Chatterton**

Like the '357 Patent, Chatterton directs to retrieving media content and distributing it for playback across a local area network. Chatterton discloses a Home Media Server 110 to source, process, store, and distribute multimedia content over a home media network 140. EX1009, 1:59-63, FIG. 1 (reproduced below); EX1003, ¶108.



**FIG. 1**

Home media server 110 plays a similar role as the “audio information channel device 23” described in the '357 Patent, including, to obtain audio content from sources outside the local network, to generate and distribute audio and video data

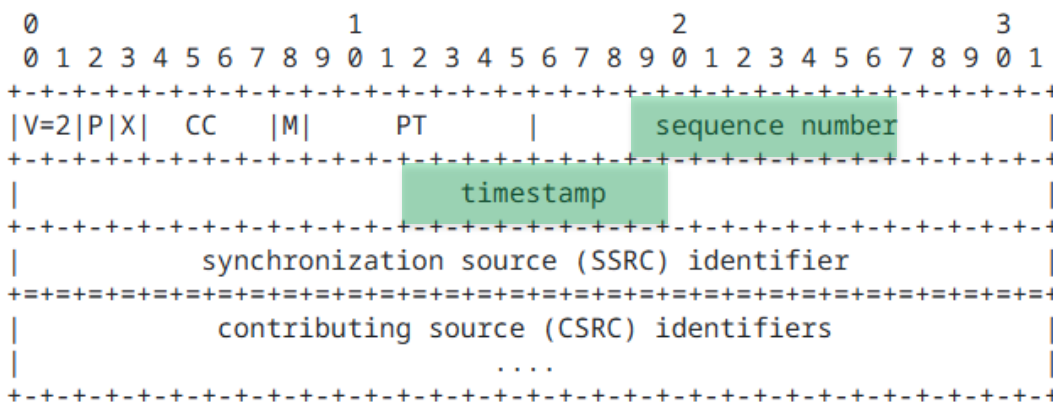
streams to other playback devices over the network for synchronous playback, while can also playback the content itself along with others, acting as a master device of the playback group. EX1001, 7:51-17:53, FIG. 2; EX1009, 1:63-4:3, 12:49-55, 7:29-32, 13:51-55, 5:38-46; EX1003, ¶¶109-13. Specifically, Chatterton discloses Server 110 creates these data streams using the streaming protocol RTP/RTSP, which includes multiple RTP packets each including “timestamping and synchronization information in its header for proper reassembly at the receiving end.” EX1009, 5:38-46, EX1003, ¶115.

Chatterton further explains that various devices on network 140 can communicate with and control Server 110, e.g., remote control devices 530, 532. EX1009, 7:29-32, 13:51-55; EX10003, ¶116. Server 110 may transmit status updates back to a monitoring or control device. EX1009, 9:12-15; EX1003, ¶116.

## **B. Overview of RFC1889**

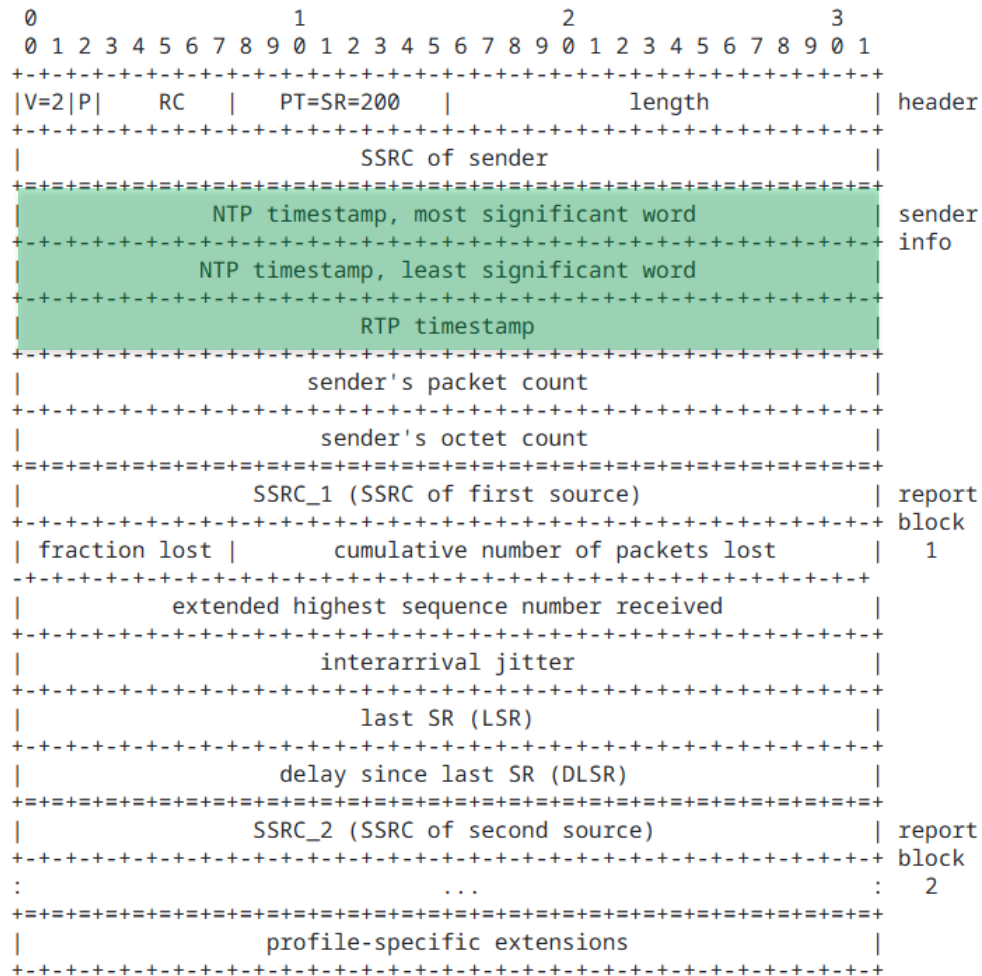
RFC1889 is an RTP standardization document published by IETF January 1996 for the RTP protocol. EX1010, 1; EX1003, ¶117. Chatterton specifically refers to RTP/RTSP was a well-known protocol for streaming audio and video. EX1009, 5:38-62. As explained in RFC1889, RTP provides end-to-end network transportation of audio and video data. EX1010, 1. Consistent with the Chatterton disclosure, RFC1889 also discloses that RTP uses RTP headers on top of UDP payloads, and that the headers are used to convey timing information to allow correct playback

timing despite unreliable transmissions. EX1009, 5:38-62; EX1010, 5, 10; EX1003, ¶121 (annotated figure below showing, in green, sampling timestamp to identify when it was created and a sequence number to identify its order amongst other packets in the stream). The timestamp reflects the sampling instant is an incremental value based on the source’s clock and frequency. EX1010, 11-12; EX1003, ¶122.



**EX1003, ¶121 — EX1010, 10 (annotated)**

RTP is supported by a control protocol called “RTCP,” under which a device transmits RTCP sender reports to each other device providing its own clock information, for synchronization. EX1010, 1, 23; EX1003, ¶123. Annotated figure below shows, in green, the device clock information in the form of an NTP timestamp, which provides wallclock time when the data is sent, or a RTP timestamp, which provides the transport stream timestamp based on the sampling frequency and counter. EX1010, 24-25; EX1003, ¶¶124-25.



**EX1003, ¶124 — EX1010, 23 (annotated)**

RFC1889 further explains that the reports additionally provide application specific information necessarily to monitor the transport stream's senders and receivers. EX1010, 25; EX1003, ¶126.

In light of Chatterton's express disclosure of creating multimedia streams distributed over a network for synchronous playback using the RTP protocol and that RFC1889 being the standardization document of the RTP protocol, a POSITA would understand Chatterton to inherently disclose the use of the RTP standards as

specified in RFC1889 to create its streams. EX1009, 5:38-46, 8:36-45 (“the tuner server module 602 creates the stream using the RTP/RTSP protocol”), 8:54-67 (“the tuner server module 252 uses the RTP/RTSP protocol to create the stream”); EX1010, 1; EX1003, ¶328. That includes the disclosure of using RTP’s packet header timestamping and synchronization information, as well as RTCP’s sender report NTP and RTP timestamps supporting synchronized playback. EX1003, ¶328. To the extent such disclosures are not inherent to Chatterton, a POSITA would have known them in light of this familiarity of the well-known RTP standards. EX1003, ¶¶329-30.

### **C. Independent Claim 1**

#### **1. Chatterton discloses [1.p]**

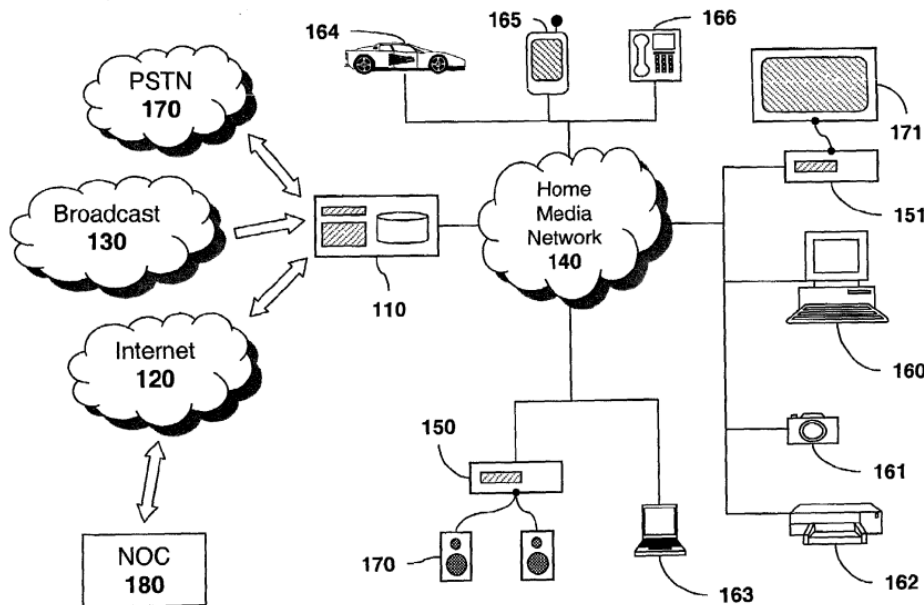
Chatterton discloses [1.p] by disclosing methods of playback media content across a home media network (“*method*”). *See e.g.*, EX1009, 1:22-36, 1:59-63, 1:63-4:3, 5:38-46, & Figs. 1, 6a, and 16c; EX1003, ¶332-333.

#### **2. Chatterton discloses [1.1.1]**

Chatterton discloses or otherwise renders obvious [1.1.1] by disclosing a home media server 110 (“*first playback device*”) that receives selection commands (“*control information*”) from either of remote control unit 532 and/or computers 160/163 (“*network device configured to control the first playback device*”) over home media network 140 (“*LAN*”), and the commands includes information such as

broadcast channel or URLs (“*address identifying an audio information source*”) identifying a location of audio content (“*audio information*”) on broadcast or internet channels (“*audio information source*”). EX1009, 1:63-4:3; EX1003, ¶334.

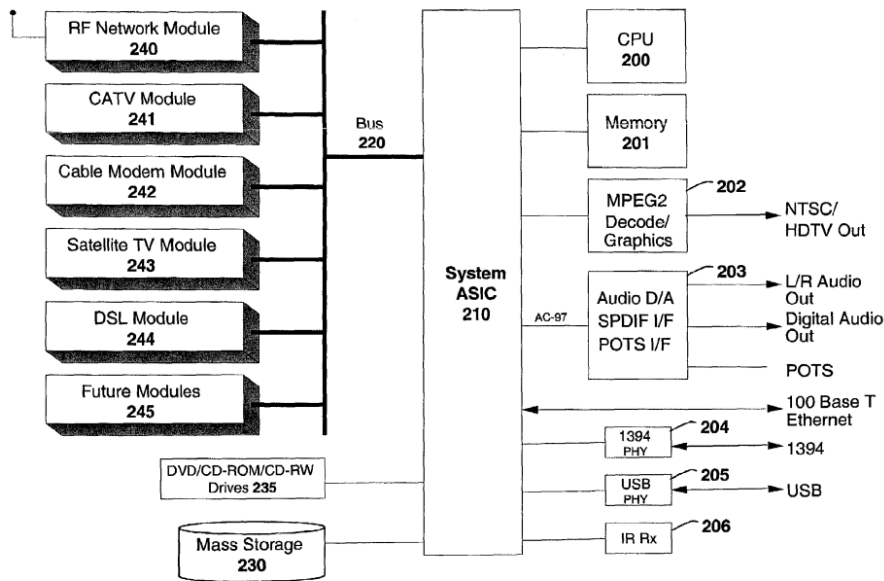
Chatterton discloses a home media network 140 (“LAN”) connecting various devices, including home media server 110, multimedia nodes 150 and 151, and remote control 532 and PCs 160/163, etc. EX1009, FIG. 1; *see also* EX1003, ¶336.



**FIG. 1**

Chatterton discloses home media server 110 retrieves, processes, and outputs audio data to other network devices, and thus is a *playback device*. EX1009, 1:63-4:3, 12:49-55; *see also* EX1009, Fig. 3 (A/V output ports 307 and 308); EX1003, ¶337. Specifically, Chatterton discloses server 110 to include various decoders and an audio module 203 comprised of a digital-to-analog converter, and in one

embodiment, include “a DVD player 420” and/or “a CD player” that can play the content directly, and thus a playback device itself. EX1009, 4:56-63;12:49-55, FIGs. 2a, 2b, 4.



**FIG. 2a**

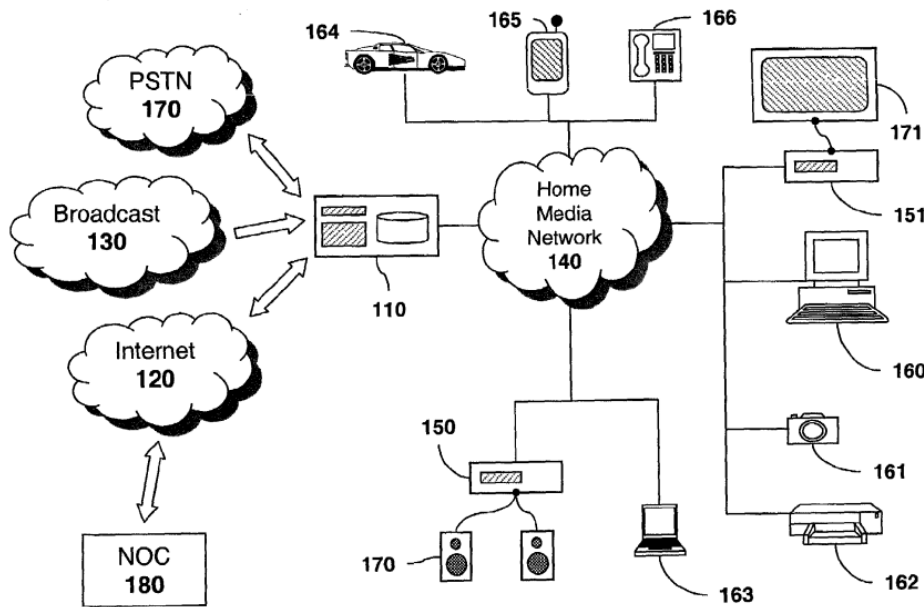
Chatterton further discloses that home media server 110 may be controlled by remote control 532 and PCs 160/163 (“network device”). EX1009, 13:49-55, 7:29-32, 8:18-25, 8:49-54; EX1003, ¶¶338-39. For example, remote control unit 532 sends commands to home media server 110 through a multimedia node. EX1009, 13:49-55; EX1003, ¶339. Chatterton additionally discloses home media server 110 can be controlled remotely through a web browser to “select broadcast listings and direct the home media server 110 to make recordings,” or by a monitoring device 180, and a POSITA would recognize that these control functions can all be

performed by computers 160/163. EX1009, 12:3-5, 15:5-12; EX1003, ¶¶339-340. Remote control 532 and PCs 160/163 are all coupled to the home media server 110 over network 140 (“*communicatively coupled to the first playback device over a local area network*”). EX1009, 13:49-55; EX1003, ¶¶341-42.

Chatterton further discloses that commands or requests to home media server 110 identify specific audio to be obtained from specific locations, such as a particular broadcast channel (e.g., cable, satellite broadcast), a jukebox server, or the Internet (“*audio information source*”). EX1009, 8:18-25, 8:54-58, 14:19-22, 12:55-59; EX1003, ¶¶343-45. For example, Chatterton discloses that server 110 may request “pay-per-view” content (“*audio information*”) from various cable/satellite operators (“*audio information sources*”). EX1009, 11:35-39; EX1003, ¶¶346-47. The commands identify the audio location by a broadcast channel or a website URL (“*address identifying an audio information source*”). EX1009, 14:19-22; 12:55-59; 6:30-41; EX1003, ¶346.

### **3. Chatterton discloses [1.1.2]**

Chatterton discloses [1.1.2] by disclosing internet channels 120 and cable/satellite operators on broadcast channels 130 (“*audio information sources*”) outside of home media network 140 (“*outside the LAN*”). EX1009, 1:63-4:3, FIG. 1; EX1003, ¶¶348-49.



**FIG. 1**

**4. Chatterton discloses [1.2.1]**

Chatterton discloses after receiving the commands (“*control information*”), home media server (“*first playback device*”) retrieving audio and video content (“*audio information*”) from internet 120 and/or cable/satellite operators (“*audio information source outside of the LAN*”). EX1009, 8:18-35, 8:54-58, 14:19-22, 12:55-59; EX1003, ¶¶350-352.

For example, home media server 110 receives a request (“*control information*”) to tune to a particular broadcast channel (e.g., cable, satellite broadcast) and the home media server obtains the content of that channel (“*audio information*”) from the cable/broadcast source (“*audio information source outside of the LAN*”). EX1009, 8:18-35. A POSITA would understand from Chatterton that a similar

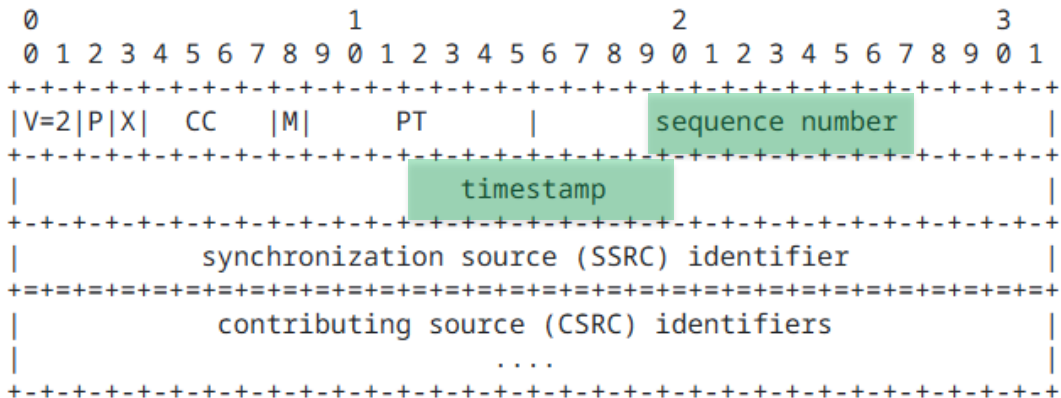
process would occur for obtaining internet audio from a website or other source. *See* EX, 1003, ¶¶351-352.

#### **5. Chatterton discloses [1.2.2]**

Chatterton discloses that home media server 110 (“*first playback device*”) distributes audio and video content (“*audio information*”) as a stream with timestamps for playback (“*playback timing information*”) and transmits a resynchronization signal 1616 (“*device clock information of the first playback device*”) to devices 160-163 and multimedia nodes 150 and 151 (each a “*second playback device*”). EX1003, ¶¶353-68. Chatterton further discloses using RTP streams, which includes packet sequence numbers and sampling timestamps (“*playback timing information*”) and RTCP report packets including NTP timestamps and RTP timestamps (“*device clock information of the first playback device*”). EX1003, ¶¶353-68.

Before distributing media content over network 140, home media server 110 converts the stream format to ensure compatibility with the respective devices. EX1009, 1:8-11; EX1003, ¶358. Chatterton expressly discloses that the media streams (audio/video) are created “using the RTP/RTSP protocol.” EX1009, 8:36-47; EX1009, 8:54-67; EX1003, ¶359. Each “RTP packet” in the stream “includes timestamping and synchronization information in its header for proper reassembly at the receiving end” (“*playback timing information associated with audio*

*information*”). EX1009, 5:38-46; EX1003, ¶¶359-361. Indeed, with Chatterton’s express disclosure that its streams and RTP packets created according to RTP/RTSP protocol, a POSITA would recognize the “timestamping and synchronization information in its header” specifically refer to the packet sequence number and sampling timestamps used to calculate a time to play a packet based on the intervals between the packets and the sampling frequency (“*playback timing information*”), which are provided on headers of the data streams (“*associated with audio information*”), as shown in the RTP standards specified by RFC1889. EX1009, 5:38-46; EX1010, 10; EX1003, ¶¶360-63 (annotated figure below). Therefore, Chatterton’s “timestamping and synchronization information” discloses “*playback timing information.*” See EX1003, ¶363.



**EX1003, ¶362 — EX1010, 10 (Annotated)**

Further, home media server 110 (“*first playback device*”) sends “a resynchronization signal 1616” from its content conversion module (“*device clock*”).

*information of the first playback device*”) to home media network 140 devices e.g., 150-151 and 160-163 (each a “*second playback device*”), for them to resynchronize playback when there is “a non-consecutive jump in the SCR/PCR timestamps.” EX1009, 26:47-52, 28:42-47; EX1003, ¶364. Chatterton explains that different formats, such as “System Clock Reference” (SCR) timestamps and “Program Clock Reference” (PCR) timestamps, use different spacing between playback timestamps. EX1009, Abstract, EX1003, ¶¶364-66. A POSITA would understand that in order for Chatterton’s resynchronization signal to achieve its stated purpose of “proper reassembly at the receiving end” when the playback timing timestamps are non-consecutive, it must include information of the home media server 110’s clock, such as at least a current time value of the clock. EX1009, 5:38-46; EX1003, ¶365. Accordingly, resynchronization signal 1616 constitutes “*device clock information of the first playback device.*” EX1003, ¶¶364-367.

Additionally, Chatterton discloses that its media streams are created using an RTP, which includes RTCP as “a companion protocol to the realtime transport protocol (“RTP”) used to maintain a minimum QoS.” EX1009, 16:12-15. The implementations of RTCP packets in RTP and RTCP were well-known at the time, and a POSITA would have understood Chatterton’s disclosure of using RTP and RTCP to inherently include the use of the RTCP sender report packets that include “*device clock time information,*” in at least the forms of its “NTP timestamp” and



**6. Chatterton discloses [1.2.3]**

Chatterton discloses that home media server 110 (“*first playback device*”) is a playback device itself and can playback the media streams (“*audio information*”) directly using associated playback timestamps and sequencing (“*playback timing information*”) and clock information in resynchronization signal 1616 or otherwise in RTCP sender reports (“*device clock information of the first playback device*”), and it also transmits the same media streams according to real-time protocols, to devices 160-163 and multimedia nodes 150 and 151 (each a “*second playback devices*”) for synchronized playback. *See supra*, Sections VII.C.2-5; EX1003, ¶¶369-70.

Chatterton discloses the receiving device (“*second playback device*”) plays back by decoding it and outputting it, e.g., through audio amplifiers and speakers. *See supra*, Section VII.C.5; EX1003, ¶¶371-372. The playbacks between the two ends are *in synchrony* because Chatterton discloses that the home media server 110 provides “real time transmission of voice and video” over a home media network 140 “for proper reassembly at the receiving end.” EX1009, 5:38-51; 5:53-62; EX1003, ¶370. Further, on the receiving end, the decoders in the devices on home media network 140, including devices 160-163 and multimedia nodes 150, (each a “*second playback device*”) play back content according to the timestamps provided with the media content and use the resynchronization signals to resynchronize with

the home media server. EX1009, 26:47-52, 6:36-41; EX1003, ¶¶371-72. Chatterton provides various settings for home media server 110 to play back the same content, such as content from a radio channel or a music jukebox, along with the receiving devices. EX1009, 8:17-67; 12:49-55. A POSITA would also understand that networked playback devices, including home media server 110 and others on home media network 140, are used for playing back same content in synchrony, in various home entertainment settings, such as a home theater. EX1003, ¶¶373-75. Indeed, home media server 110 plays a similar role as the “audio information channel device 23” described in the ’357 Patent, in coordinating and participating in the synchronize playback over the network, acting as a master device of the playback group. EX1001, 7:51-17:53, FIG. 2; EX1009, 1:63-4:3, 12:49-55, 7:29-32, 13:51-55, 5:38-46; EX1003, ¶¶373-75. Chatterton additionally discloses the use of home media server to provide simultaneous streams at once, such as to multiple media nodes and surround sound devices, and a POSITA would understand that the simultaneous distribution of realtime streams of the same content with synchronized playback timing information to different devices is for the devices to playback the content simultaneously. EX1009, 5:53-62, 6:64-7:3, 13:16-23; EX1003, ¶¶374-75.

#### **7. Chatterton discloses [1.2.4]**

Chatterton discloses using a resynchronization signal 1616 from home media server 110 to “resynchronize” playback with devices on network 140. *See supra*,

Section VII.C.5. For Chatterton's network 140 devices to ever need "resynchronization," it is inherent that they must include their own clocking components. EX1003, ¶¶377-78. For example, Chatterton discloses the inclusion of a decoder 1620, which inherently includes a digital-to-analog converter having a clocking circuit for processing samples. EX1009, 26:47-52; EX1003, ¶¶377-78. Chatterton therefore discloses or otherwise renders obvious that home media server 110 ("*first playback device*") and devices 160-163 and multimedia nodes 150 and 151 (each a "*second playback device*") are "*independently clocked.*" EX1003, ¶¶379-81.

Chatterton therefore anticipates or alone renders obvious claim 1.

#### **D. Dependent Claim 2**

As described above regarding element [1.2.2], Chatterton discloses or suggests, home media server 110 ("*first playback server*") creates audio streams ("*audio information*") with RTP headers ("*associated playback timing information*") and resynchronization signal 1616's clock information and/or RTCP packets' NTP and RTP timestamps ("*device clock information*"). *See supra*, Section VII.C.5; *see also* EX1003, ¶¶382-386.

Chatterton expressly discloses that the media streams (audio or video) are generated by the home media server 110 "using the RTP/RTSP protocol." EX1009, 8:36-47, 8:54-67. Specifically, Chatterton discloses that "resynchronization signal

1616 is generated by the content conversion module 1610.” EX1009, 26:47-52; EX1003, ¶¶382-86.

Chatterton therefore anticipates or alone renders obvious claim 2.

### **E. Dependent Claim 3**

Chatterton discloses that commands (“*control information instructions*”) on home media network 140 include commands to play media (“*playback audio information*”). As discussed for [1.1.1], the control information includes commands to home media server 110 (“*first playback device*”) can identify specific audio to be obtained from specific locations and played back. *Supra*, Section VII.C.2. As further discussed in [1.2.1]-[1.2.4], home media server 110 can be commanded to retrieve content (“*audio information*”), process it for distribution and playback directly (“*first playback device playback*”), and cause the receiving devices to decode and output to user, e.g., via speakers (“*second playback device playback*”). *See supra*, Sections VII.C.4-7. Therefore, a POSITA would have understood the control information to include “*instructions for the first playback device and the second playback device to playback audio information.*” EX1003, ¶¶387-90.

Additionally, Chatterton also discloses using RTSP as “a well-known protocol for streaming multimedia content over a network” for playback. EX1009, 5:38-46. A POSITA would be familiar with RTSP, including its ability to issue commands for playback control over a network. EX1003, ¶388. A POSITA would also have

found it obvious to use control information to instruct playback on home media network 140 devices. *Id.*

Chatterton therefore anticipates or alone renders obvious claim 3.

#### **F. Dependent Claim 4**

Chatterton discloses or suggests that remote control unit 532 and computers 160/163 (“*network devices*”) can monitor network operations (“*status of a synchrony group*”) through home media server 110 (“*transmitting, by the first playback device*”). *See* EX1003, ¶391.

As described for element [1.2.3], Chatterton discloses or suggests home media server 110 and the devices 160-163 and multimedia nodes 150-151 (“*first and second playback devices*”) play in synchrony (forming “*synchrony group*”). *Supra*, Section VII.C.6; EX1003, ¶¶391-99.

Chatterton further discloses that “home media server 110 periodically transmits a status update” (“*status information*”) for a user on devices anywhere in the world, such as NOC 180. EX1009, 9:10-15, 12:8-10. Chatterton further discloses home media server receiving various device status information from devices on network 140 and transmitting such status information to NOC 180. EX1009, 9:27-33, 9:54-61, 10:3-10, 11:17-21. Additionally, Chatterton discloses that users may monitor home media network 140 devices, including home media server 110, remotely through a “home web page,” i.e., through a browser on any network

capable device such as network computers 160/163 and/or remote control unit 532. EX1009, 15:5-12. In light of Chatterton's disclosures, a POSITA would recognize that Chatterton discloses the home media server 110 transmits device status information of itself and other devices in the synchrony group to a controller on network 140. EX1003, ¶¶391-99.

Chatterton therefore anticipates or alone renders obvious claim 3.

#### **G. Dependent Claim 5**

As described with respect to [1.2.3] and claim 4, Chatterton discloses or suggests that home media server 110 provide status information of each network 140 device that can play back in synchrony ("*synchrony group*") to a monitoring device. *Supra*, Sections VII.C.6, VII.F. Chatterton explicitly discloses that among the status information transmitted from the home media server 110 to the monitoring device includes the identifications of "home media server 110 and related home network devices 150-151 and 160-166" ("*an identification of each playback device in the synchrony group*"). EX1009, 9:54-61, 10:3-10, 11:17-21; EX1003, ¶¶400-03.

Chatterton therefore anticipates or alone renders obvious claim 5.

#### **H. Dependent Claim 6**

As described above with regard to element [1.2.2] and [1.2.3], home media server 110 provides the master timing for synchronization and is a master device for synchronized playback. *Supra*, Sections VII.C.5-6. Indeed, home media server 110

plays a similar role as the “audio information channel device 23” described in the ’357 Patent, in coordinating and participating in the synchronize playback over the network, acting as a master device of the playback group. EX1001, 7:51-17:53, FIG. 2; EX1009, 1:63-4:3, 12:49-55, 7:29-32, 13:51-55, 5:38-46; EX1003, ¶¶404-06. A POSITA would have found it obvious that any status information including the home media server 110 would include its identification as a master. EX1003, ¶¶404-06.

Chatterton therefore anticipates or alone renders obvious claim 6.

**I. Dependent Claim 7**

As described in claim 6, Chatterton discloses or suggests home media server 110 is a master playback device. *Supra*, Section VII.H; *see also* EX1003, ¶¶407-09.

Chatterton therefore anticipates or alone renders obvious claim 7.

**J. Independent Claim 8:**

**1. Chatterton discloses [8.P]**

Chatterton discloses that home media server 110 includes a central processing unit 200, main memory 201, and an application-specific integrated circuit (“ASIC”) 210. EX1009, 4:4-34, FIG. 2a. The combination of processing unit 200, memory 201, and ASIC 210 are used to store and execute instructions implementing Chatterton. EX1003, ¶¶410-13.

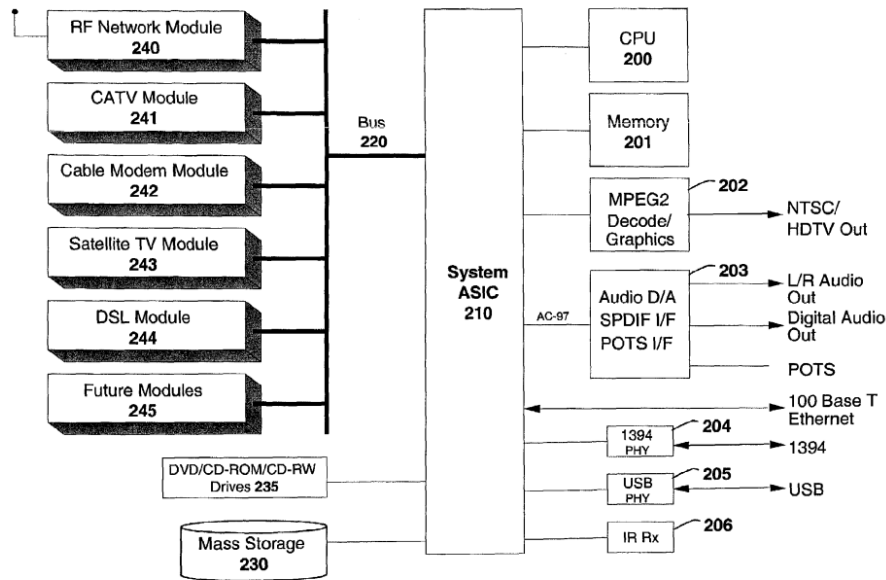


FIG. 2a

**2. Chatterton discloses [8.1.1]-[8.2.4]**

Chatterton discloses or suggests [8.1.1]-[8.2.4], which are substantively the same as elements [1.1.1]-[1.2.4]. *Supra*, Sections VII.C.2-7. EX1003, ¶¶414-16.

Chatterton therefore anticipates or alone renders obvious claim 8.

**K. Independent Claim 9:**

**1. Chatterton discloses [9.P]**

Chatterton discloses or suggests home media server 110 as a *first playback device*, for reasons discussed for [1.1.1]. *Supra*, Section VII.C.2. EX1003, ¶¶417-18.

**2. Chatterton discloses [9.1]**

For reasons explained for element [8.P], Chatterton discloses that home media server 110 includes a central processing unit 200, and an application-specific

integrated circuit (“ASIC”) 210 (“*one or more processors*”). *Supra*, Section VII.J.1; EX1009, 4:4-34, FIG. 2a; EX1003, ¶419.

**3. Chatterton discloses [9.2]**

Chatterton discloses that home media server 110 includes various network interfaces including exemplary RF network module 240, a DSL module 244, ethernet port, infrared port 206, firewire port 204, and other optional interfaces. EX1009, 4:43-5:7; EX1003, ¶¶420-22.

**4. Chatterton discloses [9.3]**

Chatterton discloses or suggests [9.3], which is substantively the same as element [8.P]. *Supra*, Section VII.J.1. EX1003, ¶¶423-25.

**5. Chatterton discloses [9.3.1]-[9.3.2]**

Chatterton discloses or suggests [9.3.1]-[9.3.2], which are substantively the same as elements [1.1.1]-[1.2.4]. *Supra*, Sections VII.C.2-7; EX1003, ¶¶426-28.

Chatterton therefore anticipates or alone renders obvious claim 9.

**L. Dependent Claims 10-15**

Chatterton discloses or suggests the additional subject matter of claims 10-15, which is substantively the same as claim 2-7, respectively. *Supra*, Sections VII.D-I. EX1003, ¶¶429-40.

**M. Dependent Claim 16**

As described regarding elements [1.2.2] and [1.2.3], Chatterton discloses or suggests that home media server 110 is a master playback device, providing timing and clock information to other devices on network 140. *Supra*, Sections VII.C.5-6. Further, on the receiving end, the decoders in the devices on home media network 140, including devices 160-163 and multimedia nodes 150 and 151 (each a “*second playback device*”), play back content according to the timestamps provided with the media content and use the resynchronization signals to resynchronize with the home media server. EX1009, 26:47-52, 6:36-41. A POSITA would understand that the network 140 playback devices, including nodes 150-151 and computers 160-163, are *slave playback devices*, and that status information regarding synchronized playback would identify them accordingly. EX1003, ¶¶441-45.

Chatterton therefore anticipates or alone renders obvious claim 16.

**N. Dependent Claim 17**

Chatterton describes transmitting media in a transport stream to devices on a home media network 140, and that the streams include frames, with each frame containing portions of content (“*audio information*”). *See, e.g.*, EX1009, 24:10-35, 29:9-24, Figs. 20-22. Therefore, Chatterton discloses that home media server 110 generate and transmit streams including frames (“*plurality of frames*”) containing

media (“*audio information*”) to network 140 devices 160-163, 150 and 151 (“*second playback devices*”). Ex1003, ¶¶446-50.

Chatterton therefore anticipates or alone renders obvious claim 17.

**O. Dependent Claim 18**

Chatterton discloses home media server 110’s media content (“*audio information*”) includes both “music files from the mass storage device 230” (“*audio files*”) and streams “comprising transport packets” (“*packetized streaming*”). EX1009, 8:54-58 (files), 1:26-30 (packets); *see also*, 24:39-49; EX1003, ¶¶451-54.

Chatterton therefore anticipates or alone renders obvious claim 18.

**P. Dependent Claim 19**

Chatterton describes that home media server 110 can retrieve audio content (“*audio information*”) from the Internet, e.g., websites (“*internet-accessible audio information source*”). EX1009, 14:19-22; 12:55-59. Further, home media server 110 can perform processing functions for other network devices, such as to download content from websites (“*audio information from the Internet-accessible audio information source*”) for multimedia node 150. EX1009, 6:30-41, 8:4-8. Therefore, Chatterton discloses home media server 110 retrieving media from internet locations outside of home network 140. EX1003, ¶¶455-57.

Chatterton therefore anticipates or alone renders obvious claim 19.

**Q. Dependent Claim 20**

Chatterton discloses that home media server may request “pay-per-view” content (“*a request for the audio information*”) from various cable/satellite operators (“*audio information sources*”). EX1009, 11:35-39. Chatterton further discloses home media server 110 requesting audio information by tuning to a particular broadcast channel (e.g., cable, satellite broadcast). EX1009, 8:18-35.

Further, as explained above regarding claims 1 and 19, Chatterton discloses home media server accessing the Internet. *Supra*, Sections VII.C, VII.P. A POSITA would understand internet protocols to require “Requests” and “Responses,” and that home media server 110 would make requests for downloadable media from any websites or internet locations. EX1003, ¶¶458-62.

Chatterton therefore anticipates or alone renders obvious claim 20.

**VIII. GROUND 6: CHATTERTON IN VIEW OF RFC1889 RENDERS OBVIOUS CLAIMS 1-20.**

For the reasons explained in Section VII, Chatterton anticipates all claims 1-20 (ground 4) or renders obvious all claims 1-20 by itself (ground 5). As established in Section VII, Chatterton in view of RFC1889 discloses all the subject matter recited in independent claims 1, 8, 9 and their dependent claims. *Supra*, Section VII.

To the extent disclosures of RFC1889 regarding the RTP/RTCP/RTSP protocols are considered not inherent to Chatterton or otherwise known to a POSTIA

as common knowledge out of his familiarity of these well-known standards, a POSITA would have found it obvious to combine Chatterton and RFC1889 to use the detailed techniques specified by RFC1889 to create the transport streams in Chatterton using the RTP and RTCP protocol, as Chatterton expressly instructed. EX1009, 5:38-46, 8:36-45 (“the tuner server module 602 creates the stream using the RTP/RTSP protocol”), 8:54-67 (“the tuner server module 252 uses the RTP/RTSP protocol to create the stream”); EX1003, ¶¶327-31. Chatterton and RFC1889 are analogous art. EX1003, ¶330. Further, because Chatterton specifically describes how to implement RTP to support the multimedia distribution system for improving a multimedia network, and the RFC1889 standard specifies how RTP is used to distribute multimedia across a network, a POSITA would have found express and sufficient teaching, suggestion and motivation from Chatterton to implement the details disclosed by RFC1889 (EX1010) along with Chatterton’s disclosures. EX1003, ¶¶327-31. A POSITA would have a reasonable expectation that such an application of RFC1889 to the home media network disclosed by Chatterton succeed and yield predictable result, as indicated by the disclosure of Chatterton. EX1003, ¶330.

Therefore, Chatterton in view of RFC1889 renders obvious claims 1-20.

## **IX. DISCRETIONARY DENIAL DOES NOT APPLY**

### **A. 35 U.S.C. § 325(d)**

The Board should not deny institution under §325(d) because no “same or substantially the same” grounds or arguments were previously presented to the USPTO. *Advanced Bionics, LLC v. Med-El Elektromedizinische Geräte GmbH*, IPR2019-01469, Paper 6 (PTAB Feb. 13, 2020) (precedential). Richenstein, Chatterton, and MOST-2.0 were not presented or considered during prosecution or reexamination. *See generally* EX1002, EX1004.<sup>6</sup> Had the Examiners known of the references above, they would not have allowed the ’357 Patent to issue, at least because both Richenstein and Chatterton expressly disclose the features that led to the allowance. *See* EX1002, 68-71; EX1004, 26-30.

Although RFC1889 was included in the reexamination request, it was not substantively discussed or addressed. RFC1889 was the final reference in a fourteen-reference combination raised by the request, SNQ7. The Patent Office rejected SNQ7, finding SNQ7’s first two references cumulative. EX1004, 4071, 4080-4081. RFC1889 was not otherwise addressed. *See generally* EX1004.

Here, RFC1889 is used exclusively to give context to a reference never before the Office, Chatterton. The Examiner materially erred by overlooking RFC1889’s

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<sup>6</sup> All statements about the prosecution history are to the best of Petitioner’s knowledge.

relevance to the challenged claims, especially because primary reference Chatterton was never considered. *See Grimco, Inc. v. Principal Lighting Grp.*, IPR2021-00968, Paper 13 at 20-21 (PTAB Nov. 22, 2021) (declining to exercise discretion where primary reference not considered during prosecution).<sup>7</sup>

Furthermore, PO's alleged secondary indicia of nonobviousness considered during the reexamination should not be a basis for discretionary denial. Secondary indicia are not relevant to Petitioner's anticipation arguments, grounds 1 and 4. *See Cohesive Techs., Inc. v. Waters Corp.*, 543 F.3d 1351, 1364 (Fed. Cir. 2008).

PO's secondary indicia lack a nexus because they relate to features "known in the prior art." *In re Kao*, 639 F.3d 1057 (Fed. Cir. 2011). The Board's decision in the reexamination, addressing secondary indicia previously presented in the district court case between the Patent Owner and reexamination requestor, clarified that PO's secondary indicia related to "the synchronous playback feature" of Sonos's products. EX1004, 27-28. However, this claim feature is disclosed in the prior art presented in this Petition. *See Yita, LLC v. MacNeil IP LLC*, 69 F.4th 1356, 1364 (Fed. Cir. 2023) ("objective indicia of nonobviousness lacks a nexus if it exclusively relates to a feature that was known in the prior art") (citations omitted).

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<sup>7</sup> PO also submitted a reference, RFC 3550, that superseded RFC1889, among approximately 500 references cited during prosecution. EX1002, 1312. RFC 3550 was never substantively addressed, let alone addressed in view of Chatterton.

Indeed, PO's secondary considerations were not fully developed or evaluated against this Petition's grounds. If they were, the claims would not have been found patentable as the secondary indicia lacks at least the requisite nexus.

**B. 35 U.S.C. § 314(a)**

No discretionary denial is warranted under §314(a) either, as the six *Fintiv* factors favor institution under *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020) (precedential) and the USPTO's *Interim Procedure for Discretionary Denials*, 8-9 (June 21, 2022) ("*Interim Procedure*").

**Factor 6** requires institution because this Petition presents anticipation and single reference obviousness grounds based on two different references each disclosing or suggesting all limitations of every challenged claim, presenting "a compelling unpatentability challenge," effectively eliminating the need to evaluate other *Fintiv* factors. *Interim Procedure* at 4-5. To the extent relevant, Factors 2-4 also favor institution.

**Factor 2:** trial will likely occur *after* the deadline for an FWD.<sup>8</sup> *See Sotera Wireless, Inc. v. Masimo Corp.*, IPR2020-01019, Paper 12 at 15 (PTAB Dec. 1, 2020) (precedential). The median and average time to trial in Delaware for jury trial cases is 32 and 34 months respectively, putting trial between two and four months *after*

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<sup>8</sup> Petitioner expects an FWD in August 2026.

the deadline for an FWD. EX1039; *see Interim Procedure*, 8-9 (valuing the time to trial statistics over scheduled trial dates).

Even considering the actual schedule, a trial is likely to be after or at least coincide with the FWD. Trial was initially set for May 2026. EX1036, 13. However, nearly a year after the original complaint, PO amended its complaint to add a new party and a new patent, prompting a joint stipulation from Petitioner and Patent Owner indicating that they “anticipate jointly requesting around a 90-day extension to all current dates,” but only requesting the Court “extend the most imminent deadlines” so as to give the new party a chance to weigh in on the schedule. EX1037; *see also* EX1038 (approving stipulation). Accordingly, the Court will likely reschedule the rest of the case, putting trial after August 2026, when the FWD is expected. Even just the “significant uncertainty around the scheduled trial date” here should favor institution. *See Sand Revolution II v. Continental Intermodal Grp. – Trucking LLC*, IPR2019-01393, Paper 24 at 8-10 (Jun. 16, 2020) (informative).

**Factor 3:** investment in the co-pending litigation has been minimal. The parties have only served initial contentions and the district court has issued no substantive orders related to the '357 Patent. Furthermore, claim construction has not begun and will not have concluded by the deadline for an institution decision,

thus favoring institution.<sup>9</sup> See *PEAG LLC v. Varta Microbattery GmbH*, IPR2020-01214, Paper 8 at 17 (PTAB Jan. 6, 2021). Furthermore, Petitioner filed this Petition only half a month after PO’s supplemental contentions, which included an identification of asserted claims. See *Fintiv*, Paper 11 at 11 (PTAB Mar. 20, 2020) (filing petition “promptly after becoming aware of the claims being asserted” weighs in favor of institution).

**Factor 4:** Petitioner will not pursue the same grounds in the district court litigation, if the IPR is instituted, which favors institution. *Sand Revolution*, Paper 24 at 7.

**Factor 1** is neutral as no stay has been requested or granted. *Fintiv*, Paper 15 at 12 (PTAB Mar. 13, 2020).

Although Petitioner is the also defendant in the litigation, **Factor 5** does not warrant denial.

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<sup>9</sup> The parties’ joint *Markman* brief is due on July 14, 2025. EX1038. Based on previous cases from Judge Ranjan, a *Markman* order is unlikely to issue until September 2025, a month *after* the deadline for an institution decision. See EX1040 (over two months between *Markman* briefing and *Markman* order), EX1041 (same).

**X. MANDATORY NOTICES UNDER 37 C.F.R. § 42.8**

**A. Real Party-in-Interest**

The real party-in-interest includes Linkplay Technology Inc. and Linkplay Technology Inc., Nanjing.<sup>10</sup>

**B. Related Matters**

To the Petitioner's best knowledge, the '357 Patent was or is involved in the following related proceedings:

*Sonos, Inc. v. Linkplay Technology Inc. et al.*, No. 1:24-cv-00131 (D. Del.) ("LP Case"), pending and to which Petitioner is a party;

*Sonos, Inc. v. D&M Holdings et al.*, No. 1:14-cv-01330 (D. Del.) ("DM Case"), terminated and to which Petitioner is not a party; and

*Ex Parte* Reexamination Control No. 90/013,959, concluded.

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<sup>10</sup> On December 19, 2024, Patent Owner amended its complaint in the LP Case to add Origin Acoustics LLC as a co-defendant. Origin Acoustics is a customer of Petitioner but is not a real party-in-interest to this IPR.

**C. Lead and Back-up Counsel and Service Information**

Petitioner identifies the following lead and back-up counsels:

<b>Lead Counsel</b>	<b>Back-up Counsel</b>
Jiayu (Mandy) Song (Reg. No. 69,583) <a href="mailto:mandy.song@bayes.law">mandy.song@bayes.law</a>  Bayes PLLC 8260 Greensboro Drive, Suite 625 McLean, VA 22102 Tel: 703-995-9887 Fax: 703-821-8128	Gang (Gavin) Ye (Reg. No. 69,585) <a href="mailto:gavin.ye@bayes.law">gavin.ye@bayes.law</a> Bayes PLLC 8260 Greensboro Drive, Suite 625 McLean, VA 22102 Tel: 703-995-9887 Fax: 703-821-8128  Andrew Landers Ramos (Reg. No. 76,865) <a href="mailto:andrew.ramos@bayes.law">andrew.ramos@bayes.law</a> Bayes PLLC 8260 Greensboro Drive, Suite 625 McLean, VA 22102 Tel: 703-995-9887 Fax: 703-821-8128

Petitioner consents to electronic service at [Linkplay-Sonos-IPR@bayes.law](mailto:Linkplay-Sonos-IPR@bayes.law), as well as the above email addresses.

**D. Standing**

Petitioner certifies under 37 C.F.R. § 42.104(a) that the '357 Patent is available for IPR, and Petitioner is not barred or estopped from requesting IPR challenging the patent claims on the grounds identified in this Petition.

**XI. CONCLUSION**

Based on the grounds specified above, IPR of all challenged claims is respectfully requested.

Respectfully submitted,

BAYES PLLC

/Jiayu Song/

Jiayu (Mandy) Song

Registration No. 69,583

Lead Counsel for Petitioner

Date: February 4, 2025  
8260 Greensboro Drive, Suite 625  
McLean, VA 22102  
(703) 995-9887

**CERTIFICATION UNDER 37 C.F.R. § 42.24(d)**

This Petition complies with the requirements of 37 C.F.R. § 42.24. As calculated by the word count feature of Microsoft Word, it contains 13,871 words, excluding the words contained in the following: Table of Contents, List of Exhibits, Mandatory Notices, Certification Under § 42.24(d), and Certificate of Service.

/Jiayu Song/  
Jiayu (Mandy) Song  
Registration No. 69,583  
Lead Counsel for Petitioner

**CERTIFICATE OF SERVICE**

The undersigned certifies that the foregoing Petition for *Inter Partes* Review, the associated Power of Attorney, and Exhibits 1001-1044 are being served on February 4, 2025, by U.S. Priority Express Mail at the following address of record for the subject patent.

**107361 – Akerman LLP / Sonos, Inc.**  
777 S. Flagler Drive,  
Suite 1100 West Tower  
West Palm Beach, FL 33401

A courtesy copy was also sent via electronic mail to Patent Owner’s litigation counsel at the following addresses:

Philip A. Rovner (#3215)  
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/Ashley Cheung/  
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