

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GOOGLE LLC,

Petitioner,

v.

SONOS, INC,

Patent Owner.

Case No. IPR2025-01590
U.S. Patent No. 10,031,715

DECLARATION OF DR. DAVID ANDERSON

TABLE OF CONTENTS

I.	INTRODUCTION	1
II.	SUMMARY OF OPINIONS	2
III.	QUALIFICATIONS AND BACKGROUND	3
IV.	MATERIALS CONSIDERED	6
V.	LEGAL STANDARDS	8
A.	Level of Ordinary Skill	10
B.	Prior Art.....	10
C.	Anticipation	11
D.	Obviousness.....	12
VI.	THE '715 PATENT	17
A.	Overview	17
VII.	CLAIM CONSTRUCTION	19
VIII.	LEVEL OF ORDINARY SKILL	21
IX.	OVERVIEW OF PRIOR ART	22
X.	THE CHALLENGED CLAIMS ARE UNPATENTABLE BASED ON THE PRIOR ART	23
A.	Ground 1: Claims 1, 7, and 13 Would Have Been Obvious Over Janevski, Muchow, and Kawamura.	23
1.	Janevski (EX-1005)	23
2.	Muchow (EX-1007)	27
3.	Kawamura (EX-1016).....	31
4.	Independent Claims	33
a.	Claim 1	33

i.	[1preamble]: “A method comprising:”.....	33
ii.	[1ai]: “a first zone player performing a master device role for a synchrony group comprising the first zone player and a second zone player,”	33
iii.	[1aii] “wherein in the master device role, the first zone player is configured to control synchronous playback of audio information by both the first zone player and the second zone player in response to playback commands received from a controller device via a network interface of the first zone player,”	36
iv.	[1aiii] “wherein the first zone player comprises one or more processors and at least one network interface;”	46
v.	[1bi]: “while performing the master device role, the first zone player (i) evaluating one or more operational performance metrics of the one or more processors or the at least one network interface indicating potential degradation in performance of synchronous playback of information content by both the first and second zone player, and”	46
vi.	[1bii] “(ii) based on the evaluation, determining that the second zone player should perform the master device role for the synchrony group;”	55
vii.	[1c]: “in response to determining that the second zone player should perform the master device role for the synchrony group, the first zone player initiating migration of the master device role from the first zone player to the second zone player; and”	57

viii.	[1di]: “after migration of the master device role from the first zone player to the second zone player, the first zone player (i) ceasing to perform the master device role for the synchrony group, and”	60
ix.	[1dii] “(ii) playing back information content in synchrony with the second zone player while the second zone player is performing the master device role for the synchrony group.”	61
b.	Claims 7 and 13	62
B.	Ground 2: Claims 1, 7, and 13 Would Have Been Obvious Over Janevski, Boyle, and Kawamura.	65
1.	Boyle (EX-1008).....	65
2.	Independent Claims	66
a.	Claim 1.....	67
i.	[1preamble] through [1aiii] and [1dii]	67
ii.	[1bi]: “while performing the master device role, the first zone player (i) evaluating one or more operational performance metrics of the one or more processors or the at least one network interface indicating potential degradation in performance of synchronous playback of information content by both the first and second zone player, and”	67
iii.	[1bii] “(ii) based on the evaluation, determining that the second zone player should perform the master device role for the synchrony group;”	72
iv.	[1c]: “in response to determining that the second zone player should perform the master device role for the synchrony group,	

	the first zone player initiating migration of the master device role from the first zone player to the second zone player; and”	73
v.	[1di]: “after migration of the master device role from the first zone player to the second zone player, the first zone player (i) ceasing to perform the master device role for the synchrony group, and”	75
b.	Claims 7 and 13	76
C.	Ground 3: Claims 2, 8, and 14 Would Have Been Obvious Over Janevski in View of Muchow, Kawamura, and Raman.....	76
1.	Raman (EX-1009).....	76
2.	Dependent Claims	78
a.	Claims 2, 8, and 14: “wherein while performing the master device role, evaluating one or more operational performance metrics of the one or more processors or the at least one network interface indicating potential degradation in performance of synchronous playback of information content by both the first and second zone player comprises the first zone player determining that at least one of the one or more processors of the first zone player is overloaded.”	78
D.	Grounds 4A/4B: Claims 3, 9, and 15 Would Have Been Obvious Over Janevski in View of Muchow, Kawamura, and Roy and Over Janevski in View of Boyle, Kawamura, and Roy.....	80
1.	Roy (EX-1010).....	81
2.	Dependent Claims	82
a.	Claims 3, 9, and 15: “wherein the one or more operational performance metrics comprise a network latency metric, and wherein while performing the master device role, the first zone	

	player evaluating one or more operational performance metrics of the one or more processors or the at least one network interface indicating potential degradation in performance of synchronous playback of information content by both the first and second zone player comprises the first zone player determining that migrating the master device role from the first zone player to the second zone player would improve latency of message transmission within the synchrony group.”	82
E.	Grounds 5A/5B: Claims 5, 11, and 17 Would Have Been Obvious Over Janevski in View of Muchow, Kawamura, and Goldberg and Over Janevski in View of Boyle, Kawamura, and Goldberg.....	85
1.	Goldberg (EX-1011)	85
2.	Dependent Claims	87
a.	Claims 5, 11, and 17:	87
i.	[5a], [11a], and [17a]: “wherein the first zone player performing the master device role for the synchrony group comprises the first zone player transmitting to at least the second zone player: (i) a network address that the first zone player uses to transmit audio information,”	87
ii.	[5b], [11b], and [17b]: “(ii) audio information, and”	91
iii.	[5c], [11c], and [17c]: “(iii) playback timing information for audio information.”	94
F.	Grounds 6A/6B: Claims 6, 12, and 18 Would Have Been Obvious Over Janevski in View of Muchow, Kawamura, and Lord and Over Janevski in View of Boyle, Kawamura, and Lord.	95

1.	Lord (EX-1006).....	96
2.	Dependent Claims	98
a.	Claims 6, 12, 18:.....	98
i.	[6a], [12a], [18a]: “the first zone player receiving control information from a controller device, wherein the control information indicates that a third zone player should be added to the synchrony group; and”	98
ii.	[6b], [12b], [18b]: “in response to receiving the control information, the first zone player transmitting slave control information to the third zone player, wherein the slave control information enables the third zone player to join the synchrony group as a slave device of the synchrony group.”	102
XI.	CONCLUSION.....	104

I. INTRODUCTION

1. I have been retained by Google LLC (“Petitioner”) as an independent expert consultant in this proceeding before the United States Patent and Trademark Office.

2. I am over 21 years of age and, if I am called upon to do so, I would be competent to testify as to the matters set forth herein.

3. I understand that this proceeding involves U.S. Patent No. 10,031,715 (“the ’715 patent,” EX-1001). The application for the ’715 patent was filed April 17, 2013, and is part of a chain of continuations of U.S. applications:

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

Those applications claim priority to U.S. provisional application No. 60/490,768 filed on July 28, 2003. EX-1001, Cover Page.

4. I have been asked by Petitioner to provide my opinion on whether the claims of the ’715 patent would have been obvious to a person of ordinary skill in the art. In performing my analysis, I have been asked to assume that the priority date of the ’715 patent is April 1, 2004. My opinions are set forth below.

5. Throughout this declaration, I refer to specific pages, figures, and/or line numbers of various exhibits. These citations are illustrative and are not intended to suggest that they are the only support for the propositions for which they are cited.

II. SUMMARY OF OPINIONS

6. This declaration considers claims 1-3, 5-9, 11-15, and 17-18 of the '715 patent. Below, I set forth the opinions I have formed, the conclusions I have reached, and the bases for these opinions and conclusions. I believe the statements contained in this declaration to be true and correct to the best of my knowledge.

7. Based on my experience and knowledge of the art at the time of the applicable priority date, it is my opinion that claims 1-3, 5-9, 11-15, and 17-18 of the '715 patent would have been obvious based on the asserted grounds that I discuss below.

Ground	Claim(s) Challenged	35 U.S.C. §	Reference(s)
1	1, 7, 13	103	Janevski, Muchow, and Kawamura
2	1, 7, 13	103	Janevski, Boyle, and Kawamura
3	2, 8, 14	103	Janevski, Muchow, Kawamura, and Raman
4A	3, 9, 15	103	Janevski, Muchow, Kawamura, and Roy
4B	3, 9, 15	103	Janevski, Boyle, Kawamura, and Roy
5A	5, 11, 17	103	Janevski, Muchow, Kawamura, and Goldberg
5B	5, 11, 17	103	Janevski, Boyle, Kawamura, and Goldberg
6A	6, 12, 18	103	Janevski, Muchow, Kawamura, and Lord

6B	6, 12, 18	103	Janevski, Boyle, Kawamura, and Lord
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8. I am being compensated for my time at my normal hourly rate. My compensation is in no way contingent upon the nature of my findings, the presentation of my findings in testimony, or the outcome of this proceeding.

III. QUALIFICATIONS AND BACKGROUND

9. I believe that I am well qualified to serve as a technical expert in this matter based upon my qualifications, discussed in detail below.

10. I am competent to write this declaration.

11. I am an independent consultant. All of my opinions stated in this declaration are based on my own personal knowledge and professional judgment. In forming my opinions, I have relied on my knowledge and experience in the fields of networking and network-based systems, such as consumer audio systems, and on the documents and information referenced in this declaration. I am over 18 years of age and, if I am called upon to do so, I am competent to testify as to the matters set forth herein.

12. In formulating my opinions, I have relied upon my training, knowledge, and experience in the relevant art. Provided as Exhibit 1004 is a copy of my current curriculum vitae, which details my education and experience, and a list of all other cases in which, during the previous four years, I testified as an expert at trial or by

deposition. The following provides a brief overview of some of my experience that is relevant to the matters set forth in this declaration.

13. I am a professor in the School of Electrical and Computer Engineering at the Georgia Institute of Technology (“Georgia Tech”) in Atlanta, Georgia. I have been a professor at Georgia Tech since 1999. In 2009 I served as a visiting professor in the Department of Computer Science at Korea University in Seoul, South Korea.

14. I received my Ph.D. in Electrical and Computer Engineering from Georgia Tech in 1999. I received my B.S. and M.S. in Electrical Engineering from Brigham Young University in 1993 and 1994, respectively.

15. In my employment prior to Georgia Tech as well as in my subsequent studies and research, I have worked extensively in areas related to the research, design, and implementation of speech and audio processing systems. In 1983-1987 and again in 1989-1991 I worked as an embedded systems developer for industrial control equipment and my responsibilities included developing low-level code and protocols for communicating between interconnected systems. Prior to my employment at Georgia Tech, I also developed prototype real-time audio systems for Sonic Innovations in 1993-1994, and various real-time audio processing systems for consulting clients from 1995-1999.

16. As a professor at Georgia Tech, I have taught graduate and undergraduate level courses at Georgia Tech on the implementation of signal

processing and embedded systems. For example, I have taught courses on multimedia processing and systems (covering topics including standards and methods for multi-channel and networked multimedia), software design, computer architecture and operating systems, real-time signal processing systems, applications of signal processing (covering topics in audio processing and communications systems), speech recognition systems, statistical machine learning, machine learning for speech, pattern recognition, and adaptive signal processing systems. I also designed and teach a course on signal processing in the context of human perception which covers audio standards and audio system design considerations. These courses and my research have covered many topics relevant to the subject matter of the '715 patent and the prior art cited therein.

17. I have served as principal investigator or co-principal investigator in numerous multi-disciplinary research projects including “Blind Source Separation for Audio,” “Audio Classification,” “Auditory Scene Analysis,” “Hearing Aid Audio Processing,” “Speaker Driver Sound Enhancement,” “I-Vector Based Voice Quality,” “Analysis of Voice Exercise Using Signal Processing,” and “Smart Homes for Effective and Safe Remote Work During a Pandemic and Beyond.”

18. I also have extensive experience with the practical implementation of signal processing algorithms, information theory, signal detection, and related topics

through my research and consulting. I have published over 200 papers in reviewed journals and conferences and books and book chapters.

19. I am a named inventor on eight patents, including “Speech activity detector for use in noise reduction system, and methods therefor” (U.S. Patent No. 6,351,731), and “Analog audio signal enhancement system using a noise suppression algorithm” (U.S. Patent No. 7,590,250).

20. I was also a co-founder of Ratrix, LLC, a company that developed efficient algorithms for reliable next-generation wireless communications systems.

21. I am a Senior Member of the Institute of Electrical and Electronics Engineers (“IEEE”) and have been a Member since 1991. I am also a Member of the IEEE Signal Processing Society. From 1994 to 2016, I was also a member of the Acoustical Society of America. In 2003, I served as the Co-Chair for the NSF Symposium on Next Generation Automatic Speech Recognition. In 2004, I received the Presidential Early Career Award for Scientists and Engineers, presented by then-President George W. Bush, for my work on ultra-low-power signal processing system design.

IV. MATERIALS CONSIDERED

22. In forming my opinions, I have reviewed the following documents and any other document cited in this declaration.

Exhibit	Description
EX-1001	U.S. Patent No. 10,031,715 (“the ’715 patent”)
EX-1002	Excerpts of File History of U.S. Patent No. 10,031,715
EX-1005	U.S. Patent No. 7,269,338 to Janevski (“Janevski”)
EX-1006	U.S. Patent No. 7,114,172 to Lord (“Lord”)
EX-1007	U.S. Patent No. 7,421,478 to Muchow (“Muchow”)
EX-1008	U.S. Patent Application Publication No. 2001/0012757 to Boyle (“Boyle”)
EX-1009	U.S. Patent No. 6,910,078 to Raman et al. (“Raman”)
EX-1010	U.S. Patent No. 5,838,909 to Roy et al. (“Roy”)
EX-1011	WIPO Publication No. WO2003/093950 to Goldberg (“Goldberg”)
EX-1012	Infringement Contentions for the ’715 Patent in <i>Sonos, Inc. v. Google LLC</i> , No. 2:20-cv-00169 (C.D. Cal.)
EX-1013	U.S. Patent Provisional Application No. 60/490,768 (’768 application”)
EX-1014	U.S. Patent No. 7,707,300 to Champagne (“Champagne”)
EX-1015	U.S. Patent No. 7,908,388 to Grundstrom (“Grundstrom”)
EX-1016	U.S. Patent Application Publication No. 2004/0048569 to Kawamura (“Kawamura”)
EX-1017	U.S. Patent No. 5,010,399 to Goodman et al. (“Goodman”)
EX-1018	U.S. Patent No. 6,353,596 to Grossglauser et al. (“Grossglauser”)
EX-1019	U.S. Patent Non-Provisional Application No. 10/816,217 (’217 application”)
EX-1020	<i>Sonos, Inc. v. Implicit, LLC</i> , IPR2018-00766, Paper 1 (P.T.A.B.)

Exhibit	Description
EX-1021	<i>Sonos, Inc. v. Implicit, LLC</i> , IPR2018-00767, Paper 1 (P.T.A.B.)
EX-1022	Infringement Contentions Cover Pleading in <i>Sonos, Inc. v. Google LLC</i> , No. 2:20-cv-00169 (C.D. Cal.)
EX-1023	Agreed Claim Constructions in <i>Sonos, Inc. v. Google LLC</i> , No. 2:20-cv-00169 (C.D. Cal.)
EX-1024	U.S. Patent No. 7,643,894 to Braithwaite et al. (“Braithwaite”)
EX-1025	U.S. Patent No. 5,369,724 to Lim (“Lim”)

23. I have also relied on my education, experience, research, training, and knowledge in the relevant art, and my understanding of any applicable legal principles described in this declaration.

24. All the opinions contained in this declaration are based on the documents I reviewed and my knowledge and professional judgment. My opinions have also been guided by my understanding of how a person of ordinary skill in the art would have understood the claims of the ’715 patent.

25. I reserve the right to supplement and amend any of my opinions in this declaration based on documents, testimony, and other information that becomes available to me after the date of this declaration.

V. LEGAL STANDARDS

26. I am not a lawyer. My understanding of the legal standards to apply in reaching the conclusions in this declaration is based on discussions with counsel for

Petitioner, my experience applying similar standards in other patent-related matters, and my reading of the documents submitted in this proceeding. In preparing this declaration, I have tried to faithfully apply these legal standards to the challenged claims.

27. I have been informed that there are two ways in which prior art may render a patent claim unpatentable. First, I have been informed that the prior art can “anticipate” a claim. Second, I have been informed that the prior art can render a claim “obvious” to a person of ordinary skill in the art. I understand that a claim is patentable if it was not anticipated and would not have been obvious in view of the prior art as of the effective filing date of the patent.

28. I have been informed that a dependent claim is a patent claim that refers back to another patent claim. I have been informed that a dependent claim includes all the limitations of the claim to which it refers.

29. I have been asked to provide my opinions as to whether the cited prior art discloses or would have rendered obvious claims 1-3, 5-9, 11-15, and 17-18 of the '715 patent from the perspective of a person of ordinary skill in the art at the '715 patent's priority date, which I have been informed to assume is April 1, 2004, as described in more detail below.

30. I have been informed that in *inter partes* review proceedings, such as this one, the party challenging the patent bears the burden of proving unpatentability

by a preponderance of the evidence. I understand that a preponderance of the evidence means “more likely than not.”

31. For the purposes of this declaration, I have been asked to provide my opinions on issues regarding unpatentability. I have been informed of the following legal standards, which I have applied in forming my opinions.

A. Level of Ordinary Skill

32. I have been informed that a person of ordinary skill in the art is determined by considering several factors, including the (i) type of problems encountered in the art; (ii) prior art solutions to those problems; (iii) rapidity with which innovations are made; (iv) sophistication of the technology; and (v) educational level of active workers in the field.

33. I have been instructed to assume that a person of ordinary skill in the art is not a specific real individual but rather a hypothetical individual having the qualities reflected by the factors discussed above.

B. Prior Art

34. I have been advised and understand that the information used to evaluate whether an invention was novel and not obvious when made is generally referred to as “prior art.” I understand that prior art includes patents and printed publications that existed before the priority date of the patent. I have been informed and understand that a patent or published patent application is prior art if it was filed

before the priority date of the claimed invention and that a printed publication is prior art if it was publicly available before the priority date. I have been informed to assume that the priority date of the '715 patent is April 1, 2004.

C. Anticipation

35. I have been informed that under 35 U.S.C. § 102, a patent claim is unpatentable for anticipation if the claimed subject matter was patented or described in a printed publication before the effective filing date of the claimed invention. I have been informed that this is referred to as unpatentability by anticipation. I have been informed that a patent claim is anticipated under § 102 if a single prior art reference discloses all limitations of the claimed invention.

36. I understand that a patent claim is anticipated only if each and every element as set forth in the claim is described in a single prior art reference. I also understand that, to be considered anticipatory, the prior art reference does not need to use the same words as the claims or provide as many details as the patent's specification; rather, it must only be enabling and describe the claimed invention sufficiently to have placed it in possession of a person of ordinary skill in the field of the invention. I further understand that to be an anticipatory reference, a prior art reference must disclose all elements of the claim arranged or combined in the same way stated in the claim.

37. I also understand that in order for a patent claim to be anticipated, each and every element set forth in the claim must be found, either expressly or inherently, in a single prior art reference, such that a person of ordinary skill in the art could practice the invention without undue experimentation. A claim limitation that is not expressly found in a prior art reference is ‘inherent’ if the prior art necessarily functions in accordance with, or includes, the limitation. It is acceptable to consider evidence outside the prior art reference to determine whether a limitation is necessarily present.

38. I understand that a dependent claim incorporates by reference all elements of the claim from which it depends. For this reason, I understand that if a reference fails to disclose one or more elements of an independent claim, it cannot anticipate any claims that depend from the independent claim.

D. Obviousness

39. I have been informed that for obviousness under 35 U.S.C. § 103, a patent claim is unpatentable if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious to a person having ordinary skill in the art to which said subject matter pertains at the time the invention was made. I have been informed that this is referred to as unpatentability by obviousness.

40. I have been informed that an obviousness analysis includes the following considerations:

- a. Determining the scope and content of the prior art;
- b. Ascertaining the differences between the prior art and the claims at issue;
- c. Resolving the level of ordinary skill in the pertinent art; and
- d. Considering evidence of secondary indicia of nonobviousness (if available).

41. I have been informed that the relevant time for considering whether a claim would have been obvious to a person of ordinary skill in the art is the time of invention. For my obviousness analysis, counsel for Petitioner instructed me to assume that the date of invention for the challenged claims is April 1, 2004. My opinions would not change if I assumed a later date of invention.

42. I have been informed that a reference may be modified or combined with other references or with a person of ordinary skill in the art's own knowledge if the person would have found the modification or combination obvious. I have also been informed that a person of ordinary skill in the art is presumed to know all the relevant prior art, and the obviousness analysis may take into account the inferences and creative steps that a person of ordinary skill in the art would employ.

43. I have been informed that whether a prior art reference would have rendered a patent claim obvious is determined from the perspective of a person of ordinary skill in the art. I have also been informed that, while there is no requirement that the prior art contain an express suggestion to combine known elements to achieve the claimed invention, and while a suggestion to combine known elements to achieve the claimed invention may come from the prior art as a whole or individually and may consider the inferences and creative steps a person of ordinary skill in the art would employ, as filtered through the knowledge of one skilled in the art, obviousness grounds cannot be sustained by mere conclusory statements and must include some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.

44. In determining whether a prior art reference could have been combined with another prior art reference or other information known to a person having ordinary skill in the art, I have been informed that the following principles may be considered:

- a. A combination of familiar elements according to known methods is likely to be obvious if it yields predictable results;
- b. The substitution of one known element for another is likely to be obvious if it yields predictable results;

- c. The use of a known technique to improve similar items or methods in the same way is likely to be obvious if it yields predictable results;
- d. The application of a known technique to a prior art reference that is ready for improvement to yield predictable results;
- e. Any need or problem known in the field and addressed by the reference can provide a reason for combining the elements in the manner claimed;
- f. A person of ordinary skill often will be able to fit the teachings of multiple references together like a puzzle; and
- g. The proper analysis of obviousness requires a determination of whether a person of ordinary skill in the art would have a “reasonable expectation of success”—but not “absolute predictability” of success—in achieving the claimed invention by combining prior art references.

45. I have been informed that, when a work is available in one field, design alternatives and other market forces can prompt variations of it, either in the same field or in another. I have been informed that if a person of ordinary skill in the art could have implemented a predictable variation and would have seen the benefit of doing so, that variation is likely to have been obvious. I have been informed that, in many fields, there may be little discussion of obvious combinations, and in these fields, market demand—not scientific literature—may drive design trends. I have been informed that, when there was a design need or market pressure and there are

a finite number of predictable solutions, a person of ordinary skill in the art would have had a good reason to pursue those known options.

46. I have been informed that the law permits the application of “common sense” in examining whether a claimed invention would have been obvious to a person skilled in the art. For example, I have been informed that combining familiar elements according to known methods and in a predictable way may suggest obviousness when such a combination would yield nothing more than predictable results. I understand, however, that a claim is not obvious merely because every claim element is disclosed in the prior art, and that a party asserting obviousness must still provide a specific motivation to combine or modify the references as recited in the claims and explain why one skilled in the art would have reasonably expected to succeed in doing so.

47. I have been informed that there is no rigid rule that a reference or combination of references must contain a “teaching, suggestion, or motivation” to combine references. But I also understand that the “teaching, suggestion, or motivation” test can be a useful guide in establishing a rationale for combining elements of the prior art. I have been informed that this test poses the question as to whether there is an express or implied teaching, suggestion, or motivation to combine prior art elements in a way that realizes the claimed invention, and that it seeks to counter impermissible hindsight analysis.

48. I am not aware of any evidence of secondary considerations that would support a determination of nonobviousness of the claimed subject matter in the '715 patent.

49. I have been informed that, in an obviousness analysis, prior art must be analogous to the patent being considered. I have been informed that a prior art reference is considered to be analogous, or in the same field of art, if the reference is either (1) in the same field of endeavor as the challenged patent, regardless of the problems the challenged patent and the prior art address; or (2) reasonably pertinent to the particular problem being solved by the challenged patent.

VI. THE '715 PATENT

50. Sonos filed the '715 patent on Apr. 17, 2013, with a priority claim to Jul. 28, 2003. EX-1001, Cover Page.

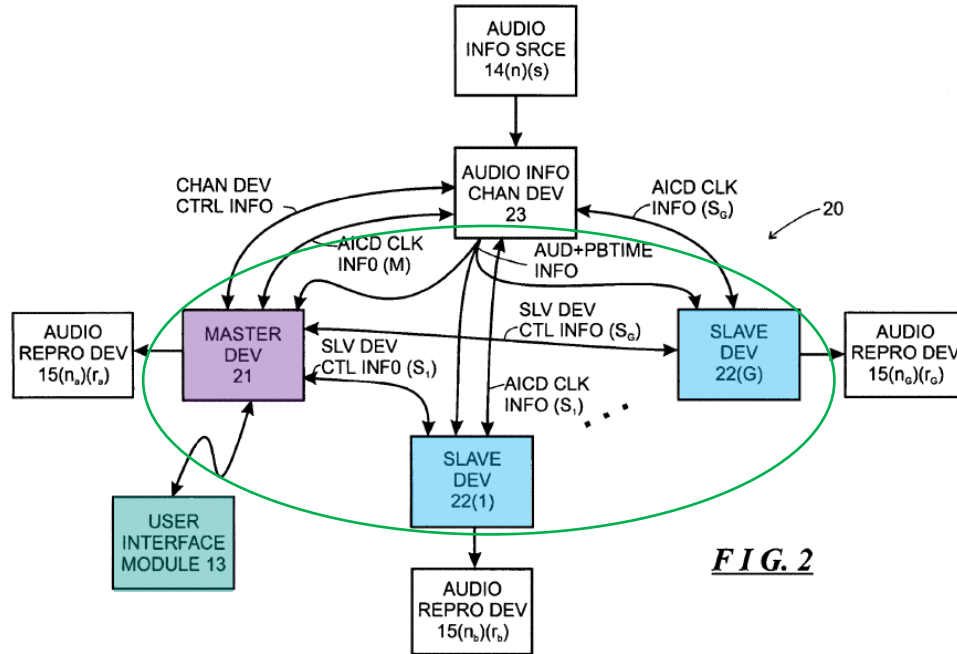
A. Overview

51. The '715 patent relates to “synchronizing of audio playback as among two or more audio playback devices.” EX-1001, 1:24-35. The '715 patent discloses a “network audio system 10 includ[ing] a plurality of zone players 11(1) through 11(N).” EX-1001, 3:48-55. “[A] synchrony group 20 includes a master device 21 and zero or more slave devices 22(1) through 22(G) ... all of which synchronously play an audio program.” EX-1001, 8:2-7. “The master device 21 is also a member

of the synchrony group 20 ... that controls the operations of the slave devices 22(g) in the synchrony group 20.” EX-1001, 8:27-36.

52. “The master device 21 receives control information from the user interface module 13 for controlling the synchrony group.” EX-1001, 9:5-9. For example, “the control information from the user interface module 13 can enable the synchrony group 20 to terminate playing of a current track of the audio program and skip to the next track, and to re-order tracks in a play list of tracks defining the audio program that is to be played by the synchrony group 20.” EX-1001, 9:31-35.

53. “[T]he master device 21 can ... initiate a migration of the master from its zone player 11(n) to another zone player 11(n’),” for example, “if it is overloaded.” EX-1001, 13:22-36. However, the ’715 patent specification does not provide any details on how migration is executed or any other examples of when master device role migration might be initiated.



EX-1001, FIG. 2.

VII. CLAIM CONSTRUCTION

54. I have been instructed that the “intrinsic record” includes the ’715 patent itself, including the claims, description, and figures (EX-1001), and the ’715 patent’s prosecution history, which I understand is the record of proceedings at the U.S. Patent and Trademark Office (“Patent Office”) concerning the patent (EX-1002). I understand that, like the claims and written description, the prosecution history provides evidence to a person of ordinary skill in the art of how the inventor intended their patent to be understood and how the Patent Office understood the patent. I understand that the inventor is permitted to apply a special definition to the terms or to limit the scope of claim terms in their patent claims, which may differ

from the term's plain and ordinary meaning. That special definition or limitation on scope may be provided in the patent's written description, the patent's prosecution history, or both.

55. I understand that claim interpretation may also be informed by “extrinsic evidence” (that is, evidence outside of the patent record itself). I have been informed that extrinsic evidence may include dictionaries, technical treatises, and other materials evidencing the meaning of a claim term and the understanding held by a person of ordinary skill in the art in the relevant time period.

56. I have been informed that the claim constructions listed below have been agreed to for the '715 patent in this case, as copied from EX-1023.

“zone player”	“data network device configured to process and output audio”
“network interface”	“physical component of a device that provides an interconnection with a data network”
“playback timing information”	“information indicating when the audio [information/content] is to be played back”

“synchrony group”	“a set of two or more zone players that are to play the same audio program synchronously”
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EX-1023.

57. I have been asked for the purposes of this declaration to apply these constructions and the plain and ordinary meaning of the claim terms as they would have been understood by a person of ordinary skill in the art at the priority date of the '715 patent. It is my opinion that the prior art relied on in the Petition discloses each of these constructions, and the plain and ordinary meaning of all other terms.

VIII. LEVEL OF ORDINARY SKILL

58. In rendering the opinions set forth in this declaration, I have been asked to consider the '715 patent's claims and the prior art through the eyes of a person of ordinary skill in the art (which I may also refer to as “one skilled in the art,” “skilled artisan,” “POSITA,” or similar variations). I have considered factors such as the educational level and years of experience of those working in the pertinent art, the types of problems encountered in the art, the teachings of the prior art, patents and publications of other persons or companies, and the sophistication of the technology.

59. Taking the factors described in the Legal Standards – Level of Ordinary Skill section into consideration, it is my opinion that a person of ordinary skill in the art (“POSITA”) at the time of the purported invention would have had the equivalent

of a four-year degree from an accredited institution in computer science, computer engineering, electrical engineering, or an equivalent thereof, and approximately four years of professional experience in the fields of networking and network-based systems or applications, such as consumer audio systems, or an equivalent level of skill, knowledge, and experience. Additional education could substitute for professional experience, and significant work experience could substitute for formal education.

60. I met the criteria for a POSITA at the effective filing date of the '715 patent.

IX. OVERVIEW OF PRIOR ART

61. In forming my opinions, I found the following prior art relevant when considering whether the claims of the '715 patent would have been obvious to a person of ordinary skill in the art.

Exhibit	Description
EX-1005	U.S. Patent No. 7,269,338 to Janevski ("Janevski")
EX-1006	U.S. Patent No. 7,114,172 to Lord ("Lord")
EX-1007	U.S. Patent No. 7,421,478 to Muchow ("Muchow")
EX-1008	U.S. Patent Application Publication No. 2001/0012757 to Boyle ("Boyle")
EX-1009	U.S. Patent No. 6,910,078 to Raman et al. ("Raman")
EX-1010	U.S. Patent No. 5,838,909 to Roy et al. ("Roy")

Exhibit	Description
EX-1011	WIPO Publication No. WO2003/093950 to Goldberg (“Goldberg”)
EX-1014	U.S. Patent No. 7,707,300 to Champagne (“Champagne”)
EX-1015	U.S. Patent No. 7,908,388 to Grundstrom (“Grundstrom”)
EX-1016	U.S. Patent Application Publication No. 2004/0048569 to Kawamura (“Kawamura”)
EX-1017	U.S. Patent No. 5,010,399 to Goodman et al. (“Goodman”)
EX-1018	U.S. Patent No. 6,353,596 to Grossglauser et al. (“Grossglauser”)
EX-1024	U.S. Patent No. 7,643,894 to Braithwaite et al. (“Braithwaite”)
EX-1025	U.S. Patent No. 5,369,724 to Lim (“Lim”)

62. As explained below, in my opinion, claims 1-3, 5-9, 11-15, and 17-18 of the ’715 patent would have been obvious based on the grounds that I discuss below.

X. THE CHALLENGED CLAIMS ARE UNPATENTABLE BASED ON THE PRIOR ART

A. Ground 1: Claims 1, 7, and 13 Would Have Been Obvious Over Janevski, Muchow, and Kawamura.

1. Janevski (EX-1005)

63. Janevski relates “synchronizing playback of two or more digital streams based on renderable content of those streams.” Janevski, 1:5-11. Janevski discloses “a **synchronized viewing session**” including “**PVRs 114a, b.**” Janevski,

6:4-18. “[B]roadcasts 112a, b of a television program ... are received by receivers 113a, b housed within each of the respective PVRs 114a, b.” *Id.* “The presentation may be ... aural.” *Id.*, 16:34-43. And “remote control 116a, b ... allow[s] the user to operate the personal video recorder 114a, b remotely.” *Id.*, 6:39-44.

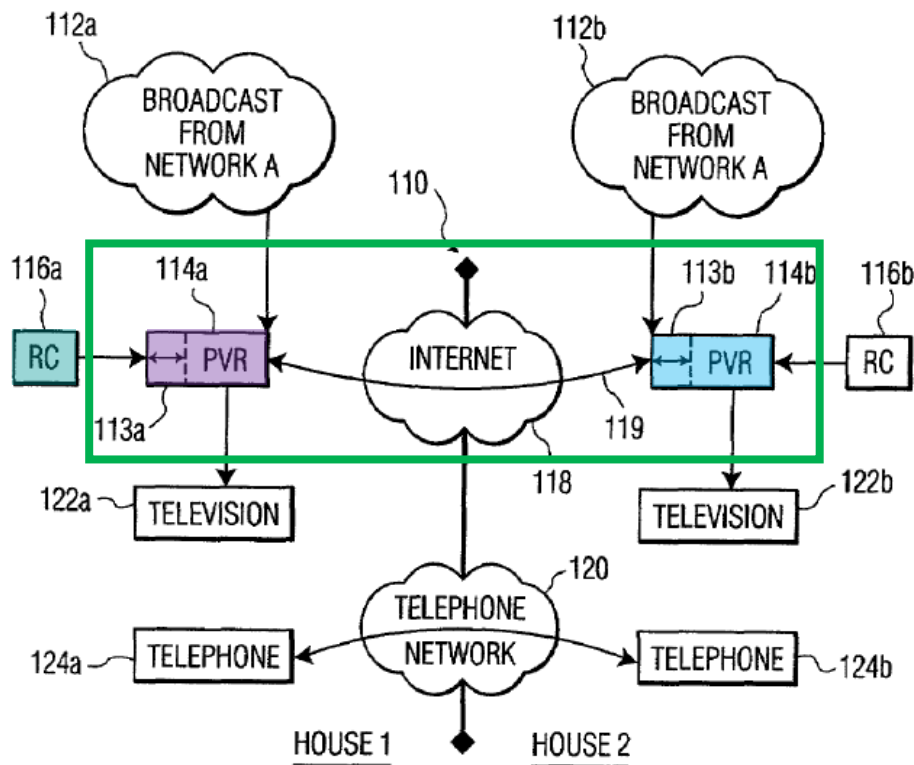
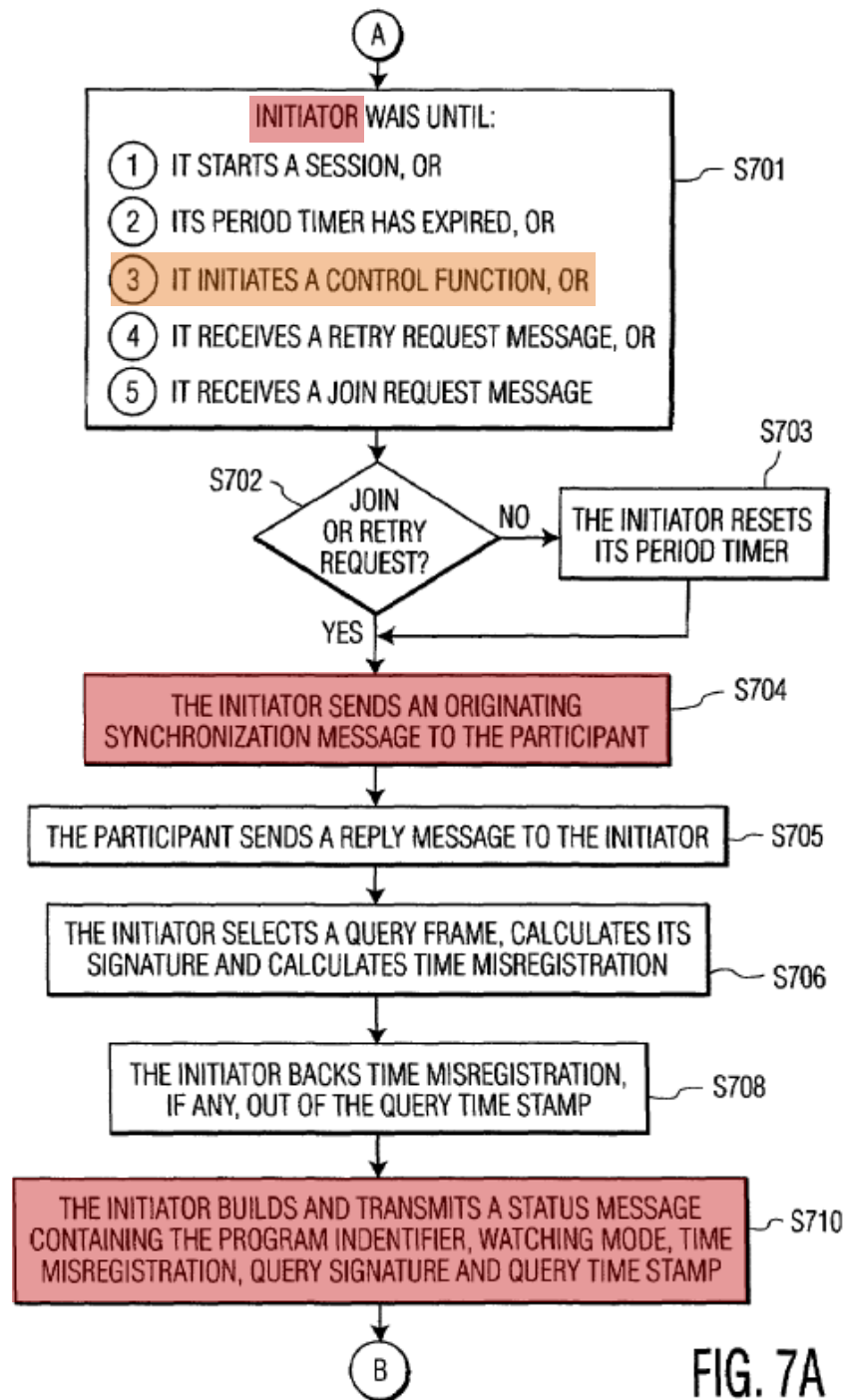


FIG. 1

Id., FIG. 1.

64. A session user “performs a control function (e.g., start, pause, rewind, fast forward).” *Id.*, 7:31-36, Abstract. When a user “executes a control function,” it “changes the watching mode.” *Id.*, 8:48-52.

65. “The **initiator** [PVR] **directs all participants** ... upon execution of each control function, and periodically, **to synchronize their playbacks to that of the initiator**, whereby all playbacks are synchronized and maintain[ed] in synchronization.” *Id.*, Abstract. “To ensure that the **PVRs 114a, b** participating in a session remain synchronous, a status message is sent out periodically by the ‘**initiator**,’ i.e., the **PVR 114a**.” *Id.*, 7:36-50. When “the role of **initiator** is handed off,” Janevski explains that “another participant **114b** assumes the role of **initiator PVR 114a**.” *Id.*, 6:16-25, 7:51-57, 15:32-43.



Id., FIG. 7A.

66. In my opinion, like the '715 patent, Janevski is in the technical field of controlling synchronous audio playback. *Compare* EX-1001, 1:25-45, 2:35-48, 5:33-39, *with* Janevski, 1:5-11, 5:3-43.

2. Muchow (EX-1007)

67. Muchow relates to “applications using a master-slave configuration” and “a protocol and method that can provide efficient failure recovery ... between nodes of a networked computer system.” Muchow, 1:9-15, 2:51-53. In Muchow’s system, each “node ... refers to a distinct processing element of a computer system.” *Id.*, 3:61-67. “Each node 102 includes one or more processors and one or more external network interfaces.” *Id.*, 4:28-36.

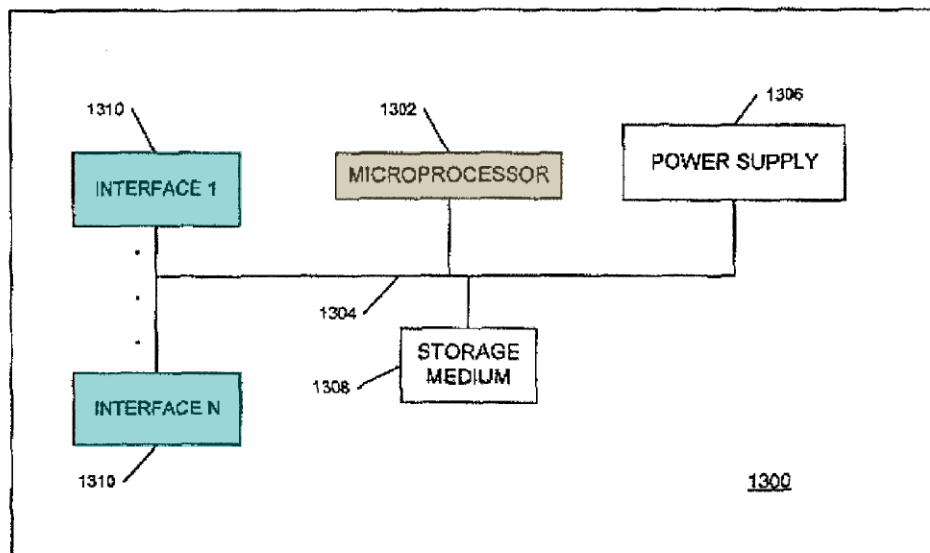


FIG. 13

Id., FIG. 13.

68. “A node 102 that is primarily responsible for (i.e., actually ‘running’) an application instance is considered a ‘master’ for that application instance, and all other nodes 102 are considered ‘slaves’.” *Id.*, 4:54-58. An “application instance” is “any node function ... whose communications relating to master-slave operation are being managed by a main task.” *Id.*, 5:10-14.

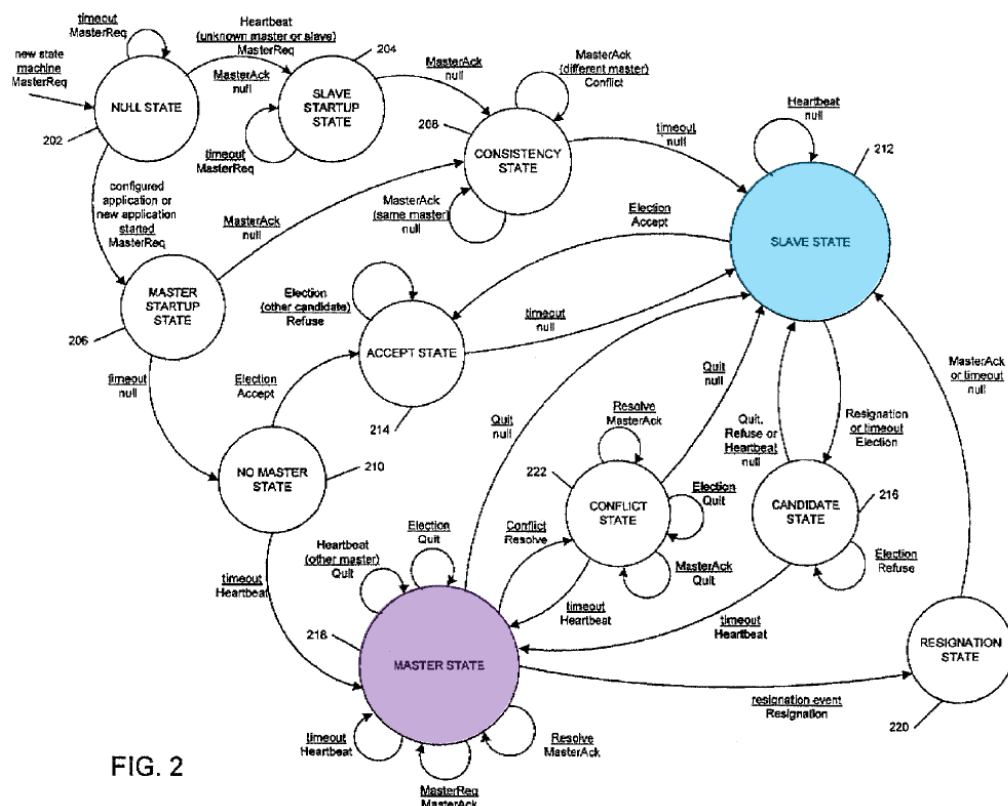


FIG. 2

Id., FIG. 2.

69. Muchow discloses a “monitor task” to “monitor the operation of the node itself and/or various functions or components associated with the node (e.g., the CPU, memory, operating system, temperature or radiation sensor, power supply, etc.).” *Id.*, 26:56-67.

70. Figure 11 illustrates that “the monitor task polls ... and determines the health and/or operational status,” and “determines whether a problem has been identified ... which indicates that the health and/or operational status of one or more application instances is degraded.” *Id.*, 27:15-60.

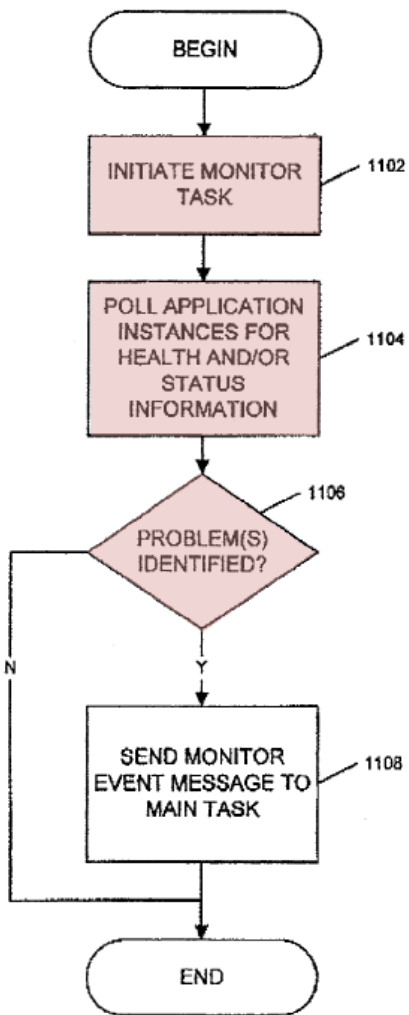
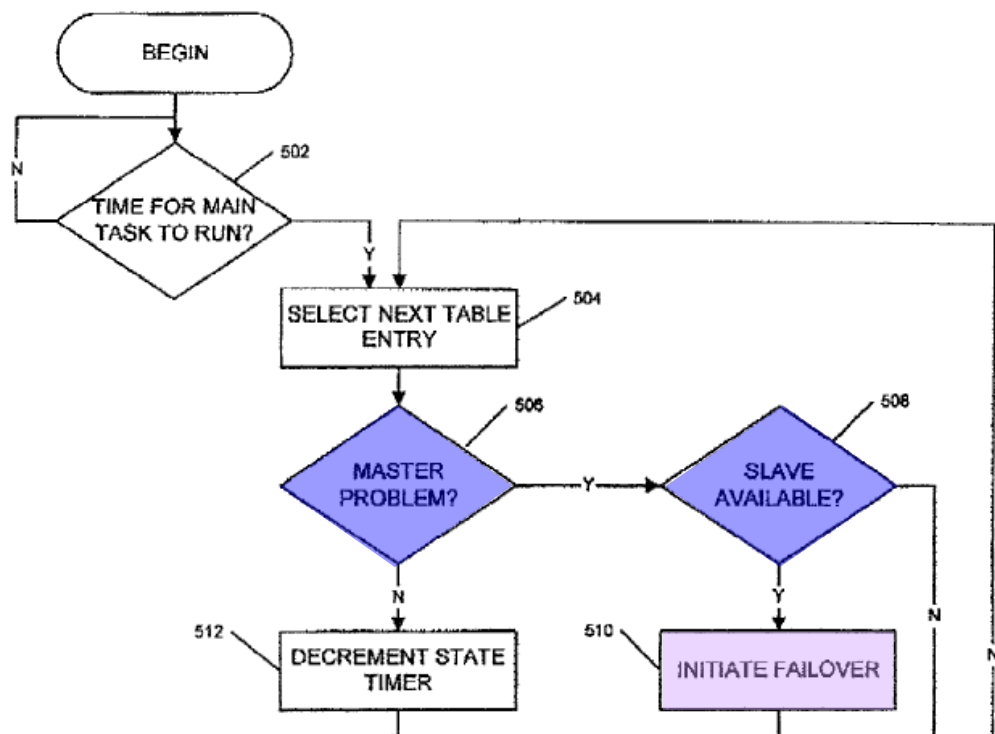


FIG. 11

Id., FIG. 11.

71. Next, “[a] determination is then made, in block 506, whether the selected entry corresponds to an application instance in the master state and, if so, whether ... a problem has occurred with the master.” *Id.*, 16:7-28. And if “a problem has occurred, then a determination is made, in block 508, whether a slave is available to take over master operations.” *Id.*, 16:29-41. “If a slave is available, then the node initiates a failover, in block 510.” *Id.*



Id., FIG. 5 (excerpted).

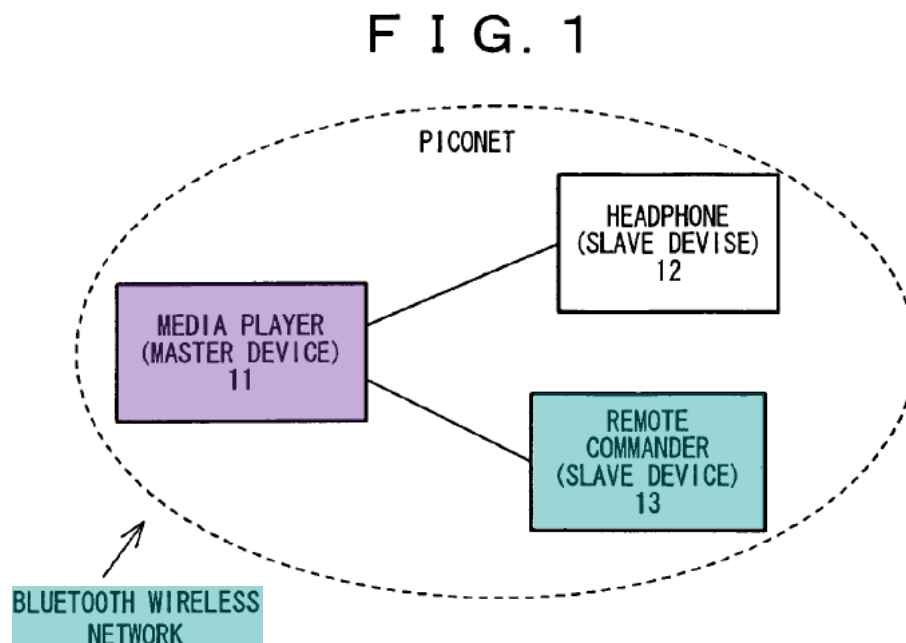
72. In my opinion, Muchow is in the same technical field as the '715 patent because it is reasonably pertinent to the problem faced by the inventor: detecting failovers and migrating the master role. Compare EX-1001, 8:41-9:4, 10:60-11:4, 13:22-36, 16:3-26, with Muchow, 1:19-2:58, 3:55-60, 4:61-5:2, 11:33-45, 11:59-

12:44. Because of the matter with which Muchow deals (fault tolerant master-slave systems), Muchow logically would have commended itself to an inventor's attention in considering this problem.

3. Kawamura (EX-1016)

73. Kawamura "relates to ... exchanging device operating commands between [] devices within a piconet ... implemented by the Bluetooth™ standard." Kawamura, [0002].

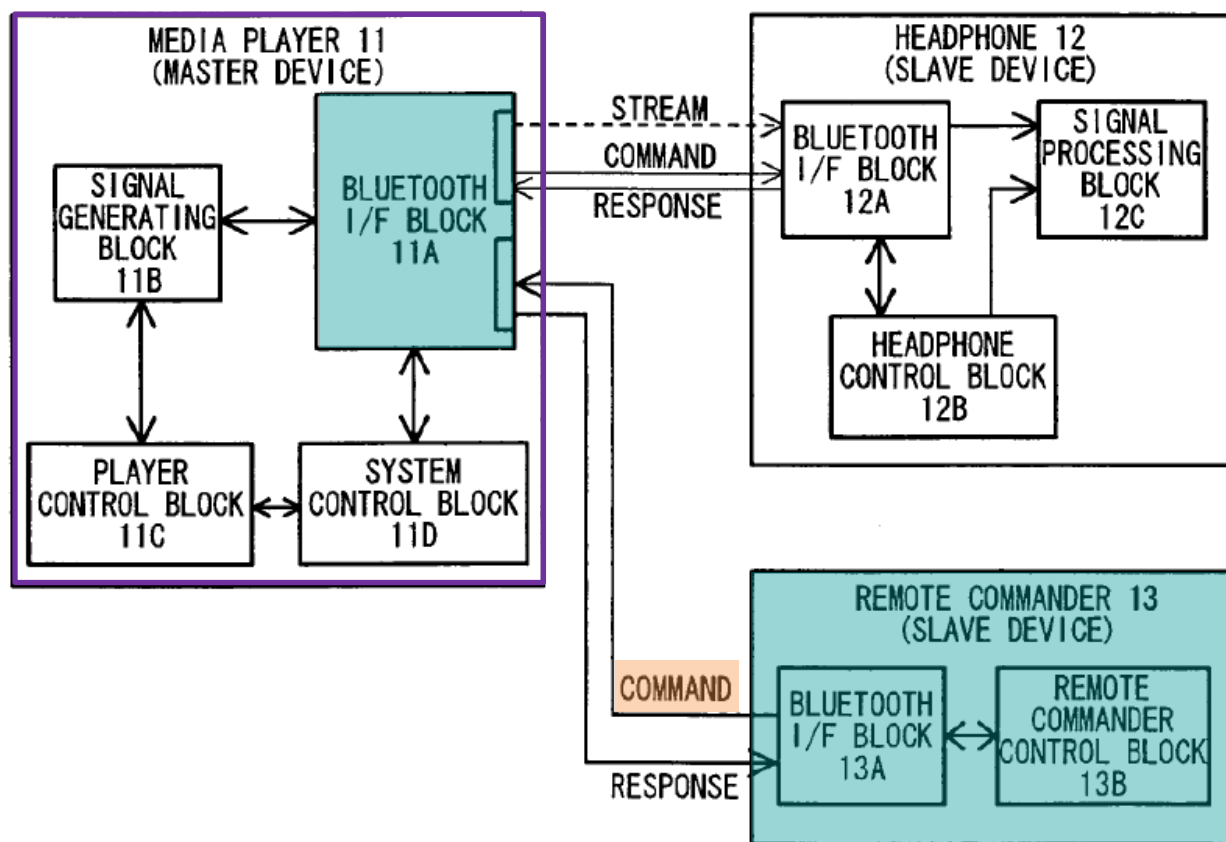
74. Kawamura discloses a "piconet 10 contain[ing] a media player 11 ... and a remote commander 13," as illustrated in Figure 1. *Id.*, [0088]. "The remote commander 13 remotely controls the media player 11 for executing play control such as play, stop, pause, fast forward and rewind." *Id.*



Id., FIG. 1.

75. Kawamura's "media player" includes "a Bluetooth interface" which "transfers commands and responses" with the remote commander 13. *Id.*, [0090]-[0091].

F I G . 2



Id., FIG. 2.

76. In my opinion, like the '715 patent, Kawamura is in the technical field of controlling audio playback. *Compare* EX-1001, 9:5-36, claims 1, 7, 13, with Kawamura, [0088], [0206].

4. Independent Claims

77. In my opinion, Janevski teaches most of claim 1, including multiple PVRs, a PVR performing the initiator role to control synchronous playback, and handing off that initiator role. Janevski, Abstract, 6:4-26, 15:43-47. In my opinion, Muchow teaches a fault tolerant system that monitors system performance to determine whether to migrate a master role. Muchow, 1:19-25, 2:51-58, 3:55-60. Finally, in my opinion, Kawamura teaches Bluetooth controllers for home entertainment systems. Kawamura, [0088]-[0091], [0100]-[0101]. In my opinion, claim 1 would have been obvious over the combination of Janevski, Muchow, and Kawamura.

a. Claim 1

i. [1preamble]: “A method comprising:”

78. In my opinion, Janevski discloses [1preamble] because it discloses a “method for synchronizing presentation from bit streams based on their content.” Janevski, 1:1-3; *see also id.*, 1:8-11, 13:22-23, 17:7-16.

ii. [1ai]: “a first zone player performing a master device role for a synchrony group comprising the first zone player and a second zone player,”

79. In my opinion, Janevski discloses [1ai] because “PVR 114a” (first zone player) and “PVR 114b” (second zone player) form a “synchronized viewing session” (synchrony group), where the “PVR 114a” (first zone player) performs an “initiator” (master device) role. Janevski, 1:13, 6:13-27, 7:57-62, 8:42-47, FIG. 1.

80. Janevski's "[p]ersonal video recorder (PVR)" "114a" discloses a first zone player. *Id.* Janevski's "[p]ersonal video recorder (PVR)" "114b" discloses a second zone player. *Id.* Each "PVR" describes a zone player because they are "playback" devices that "playback ... renderable content," including "visual" and/or "aural" information. Janevski, Abstract, 1:8-11, 2:23-45, 5:24-32, 6:5-11, 6:45-58, 10:30-35, 15:22-26, 16:33-52.

81. In my opinion, Janevski's PVRs meet the construction of "data network device configured to process and output audio" because each PVR is connected to the "Internet" network and is configured to "decompress[]" a "digital bit stream" (process) and "playback" content (output audio). Janevski, Abstract, 1:8-11, 5:24-32, 6:6-11, 6:45-58, 16:44-52.

82. The "PVR" "114a" and "PVR" "114b" playback audio content in "a synchronized viewing session," which discloses a synchrony group comprising the two zone players "PVR" "114a" and "114b." Janevski, 6:4-38, FIG. 1; *see also id.*, Abstract, 5:50-51, 7:4-16, 7:25-50, 11:4-11, 12:41-46.

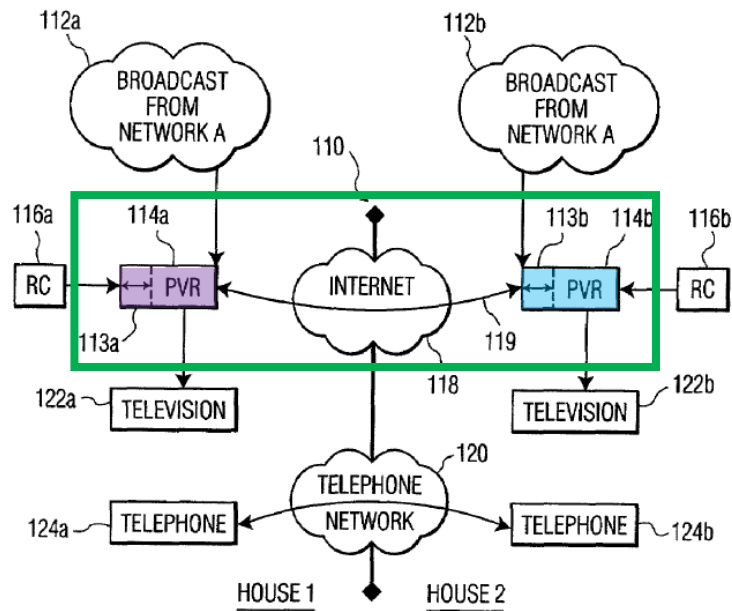


FIG. 1

Janevski, FIG. 1. In my opinion, Janevski’s “synchronized viewing session” meets the construction of “a set of two or more zone players that are to play the same audio program synchronously” because each PVR is a zone player which “view[s] the same program” or plays back “[t]he same network production” in sync. Janevski, 2:6-11, 5:7-19, 6:4-18, 12:41-46; EX-1023.

83. Janevski further discloses that the “PVR” “114a” performs the “initiator” “role” for the “synchronized viewing session.” Janevski, Abstract, 6:16-27, 8:39-52. The PVR which performs the “initiator” role discloses a device performing the master device role as explained below for [1aii]. *Infra* Ground 1, [1aii].

iii. [1aii] “wherein in the **master device role**, the **first zone player** is **configured to control synchronous playback of audio information** by both the **first zone player** and the **second zone player in response to playback commands received from a controller device via a network interface of the first zone player**,”

84. In my opinion, limitation [1aii] would have been obvious over the combination of Janevski and Kawamura. First, Janevski discloses most of the limitation because it’s “PVR 114a,” when set as the **initiator** (**first zone player in master device role**), “**directs all participants** [including PVR 114b (the second zone player)] ... **to synchronize their playbacks to that of the initiator**,” “**upon execution of each control function**” (**in response to playback commands**) received from “**remote control 116a**” (**controller device**). Janevski, Abstract, 6:39-44, 7:36-50. Kawamura teaches that it was also known to receive commands from a “**remote commander**” (e.g., a remote) via a “**Bluetooth interface**” (**via a network interface of the first zone player**). Kawamura, [0088]-[0090].

85. **Master Device Role:** As explained for [1ai], “PVR” “114a” performs the “initiator” role for the “synchronized viewing session.” *Supra* Ground 1, [1ai]. The “initiator” role discloses a master device role that controls synchronous playback because “[t]he initiator directs all participants ... to synchronize their playbacks to that of the initiator, whereby all playbacks are synchronized and maintain[ed] in synchronization.” Janevski, Abstract, 6:16-27, 8:39-52; *see also id.*, 7:25-50, 8:65-9:4, 11:12-42, 15:32-33, 16:34-43.

86. To control synchronization, “a status message is sent out periodically by the ‘initiator’, i.e., the PVR 114a” “[t]o ensure that the PVRs 114a, b participating in a session remain synchronous.” Janevski, 7:39-50; *see also id.*, 1:53-2:5. “The status message includes” information to ensure synchronized playback like “the current mode of watching (e.g., normal play, fast forward, pause), an indication of the time into the program, and information characteristic of content of a digital bit stream.” *Id.*¹

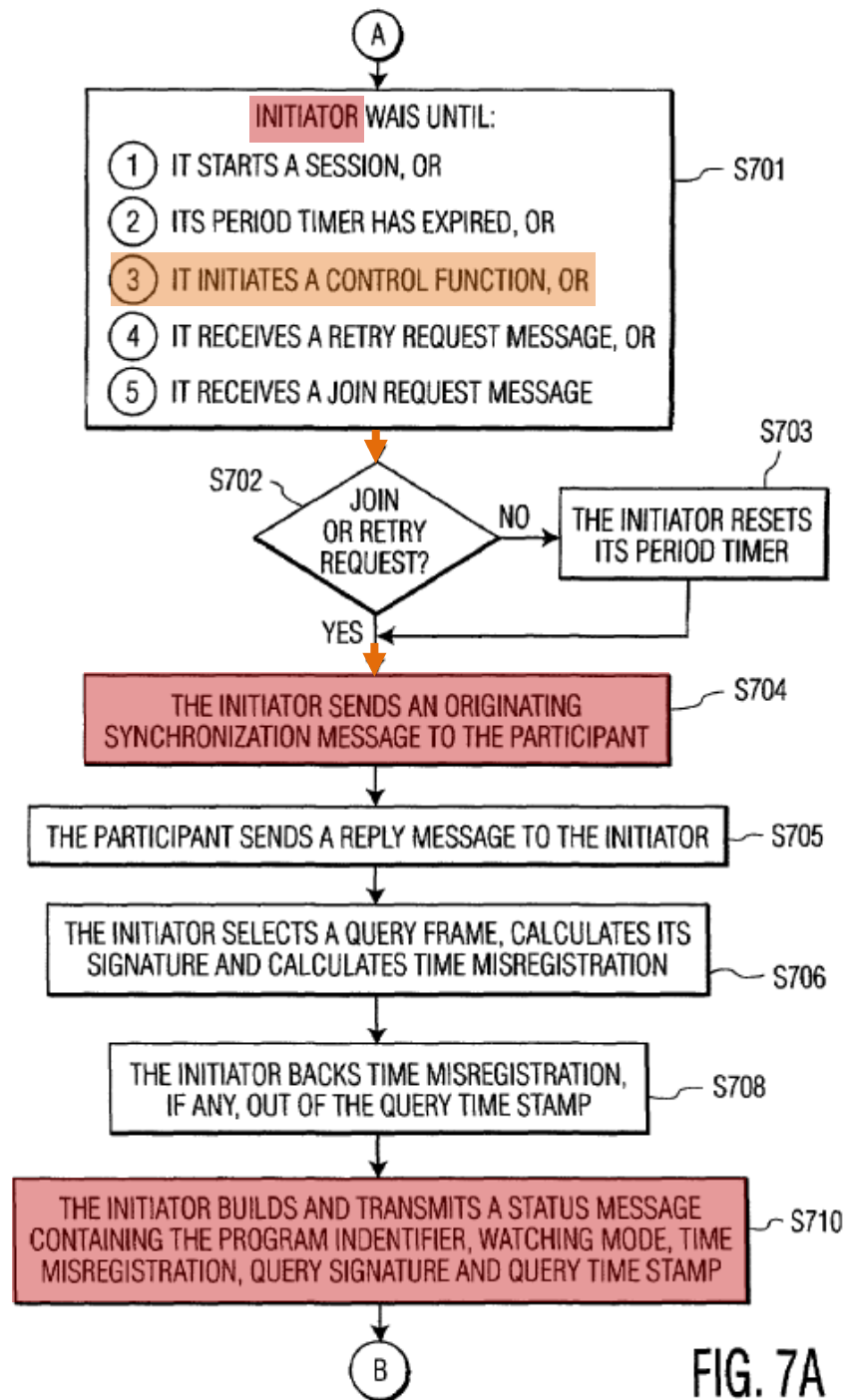
87. Janevski discloses synchronizing playback of audio information because it “applies generally to synchronizing presentation of renderable content” which “may be ... aural.” Janevski, 6:16-27, 16:34-43.

88. **In Response to Playback Commands:** Janevski discloses “control function[s],” such as “stop, pause, fast forward, [and] reverse,” which are playback commands because they control playback. Janevski, 6:18-22; *see also id.*, 1:60-2:5, 7:31-36, 7:43-44, 8:49-50, Abstract. For example, “fast forwards” means “moves forward in the video 308 faster than the video moves in normal play.” Janevski, 14:34-43.

¹ Sonos admitted that “Janevski’s ‘initiator’ PVR amounts to ... [a] ‘master device’ ... and Janevski’s one or more ‘participant’ PVRs amount to ... [‘]slave devices.” EX-1020 at 40; EX-1021 at 36-37.

89. The “initiator” controls synchronous playback in response to the “control function” because “[t]he initiator directs all participants ... *upon execution of each control function* ... to synchronize their playbacks to that of the initiator, whereby all playbacks are synchronized and maintain[ed] in synchronization.” Janevski, Abstract. Also, “the initiation of a control function” is a “*triggering event*[] for the synchronization process,” upon which “the initiator PVR 114a synchronizes with all participant PVRs 114b.” Janevski, 11:31-51; *see also id.*, 7:25-50, 11:12-12:4, 12:30-36.

90. As illustrated in Figure 7A, “initiat[ing] a control function” begins the synchronization process explained above. Janevski, FIG. 7 (capitalization altered), Janevski, 7:39-50.



Janevski, FIG. 7A.

91. Received from a Controller Device Via a Network Interface:

Janevski at least suggests receiving the playback commands from a controller device

via a network interface because Janevski discloses a “remote control 116a, b to allow the user to operate the personal video recorder 114a, b remotely.” Janevski, 6:39-44.

The “remote control” is a controller device, as shown in Figure 1. *Id.*

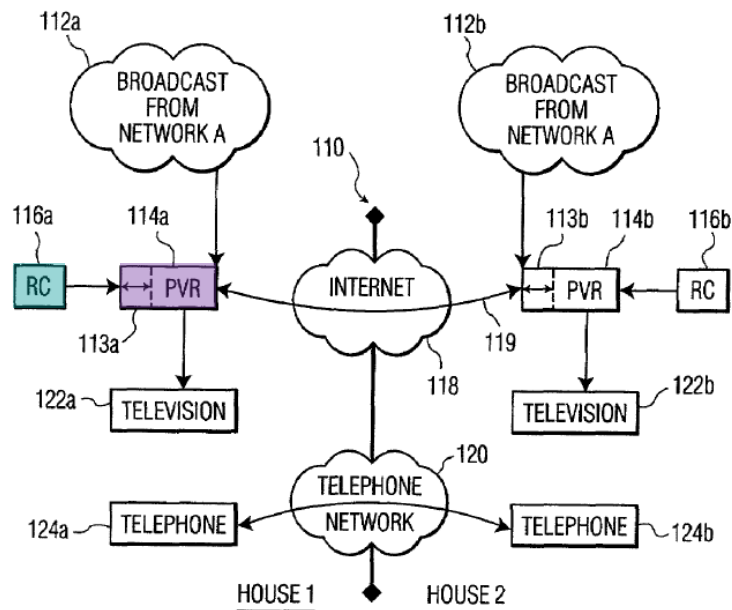


FIG. 1

Janevski, FIG. 1.

92. Janevski also discloses that “PVR 114a includes a receiver 113a,” which is a network interface because it connects to the “Internet” network to receive “broadcasts” and communicate with other PVRs. Janevski, 6:5-16, 7:57-59; *see also id.*, 6:45-48.

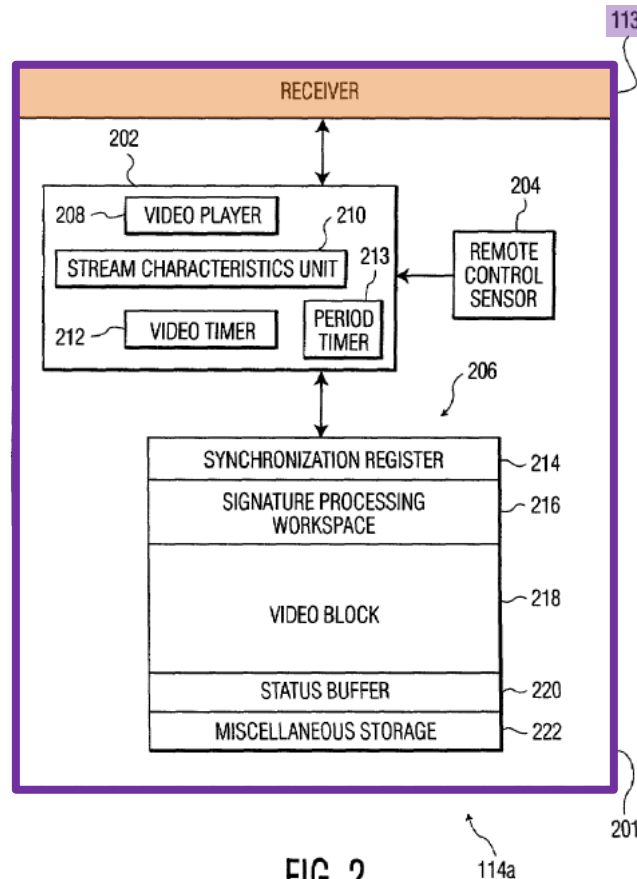
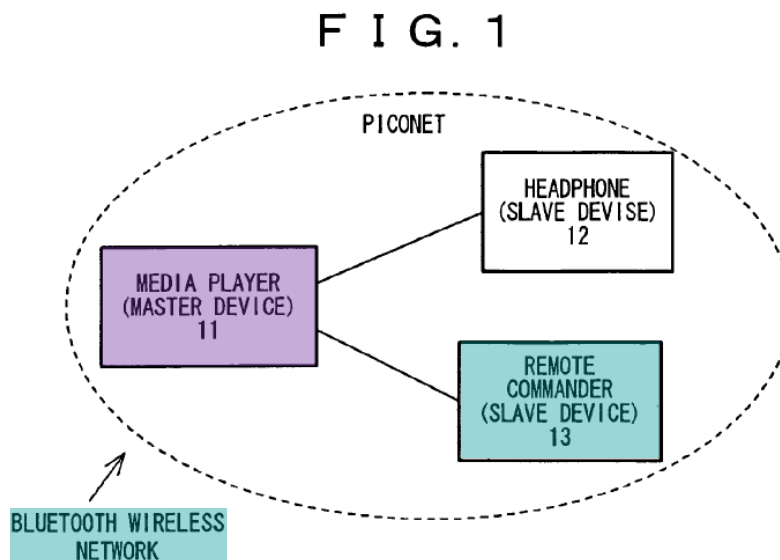


FIG. 2

Janevski, FIG. 2.

93. In Janevski’s exemplary embodiment, the “exemplary PVR 114a includes ... a remote control sensor 204,” which “receives a signal from the remote control 116a.” Janevski, 7:51-8:1. But Janevski is expressly not limited to this configuration, and while Janevski contemplates that its “remote control” is “typically” “configured to transmit an infrared signal to the television 122a, b,” in my opinion, a POSITA would have understood other wireless communication techniques were compatible with and advantageous for Janevski’s system. Janevski, 6:40-44.

94. In my opinion, Kawamura discloses one known suitable option to replace infrared—Bluetooth. Specifically, Kawamura discloses a Bluetooth “piconet 10” including “media player 11 ... and a remote commander 13.” Kawamura, [0088], [0090]-[0091], FIGs. 1, 2. Within the piconet, “[t]he remote commander 13 remotely controls the media player 11 for executing play control such as play, stop, pause, fast forward and rewind,” which discloses a controller device transmitting playback commands to the media player. *Id.*

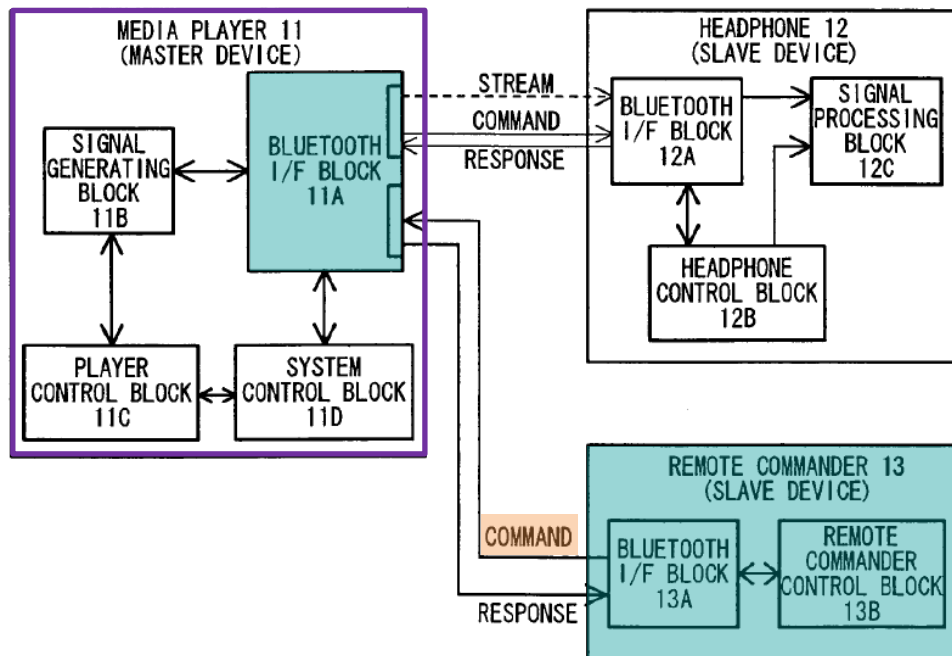


Kawamura, FIG. 1.

95. Kawamura’s “media player” includes “a Bluetooth interface,” which is a network interface that connects to the “Bluetooth wireless network.” Kawamura, [0090]-[0091], FIGs. 1-2. The “Bluetooth interface” of “media player” implements “Bluetooth wireless connection in the piconet 10 and transfer[] commands and

responses with the ... [remote commander] 13.” *Id.* Kawamura’s “remote commander” similarly includes “a Bluetooth interface” which “transfers commands and responses with the [media player] 11.” Kawamura, [0100]-[0104]. Thus, Kawamura’s “media player” (zone player) receives “commands” (playback commands) from the “remote commander” (controller device) via the “Bluetooth interface” (network interface). Kawamura, [0088], [0090]-[0091].

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Kawamura, FIG. 2.

96. As combined, Kawamura’s “remote commander” would have served as Janevski’s “remote control” and Janevski’s “PVR 114a” would have received its “control function” via Kawamura’s “Bluetooth interface.” Element [1aiii] recites “at least one network interface,” and is thus compatible with including both

Kawamura's Bluetooth network interface and Janevski's existing Internet network interface in the PVR. *Infra* Ground 1, [1aiii].

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

98. In my opinion, a POSITA would have recognized that infrared communications (as in Janevski's exemplary embodiment) are limited to line-of-sight transmission. For example, the prior art explains that “[m]any video sources, especially VCRs and cable converters, are designed to cooperate with hand-held controllers that send out infrared control signals upon command of the user,” but “[u]nfortunately signals from these devices do not travel between rooms unless there is a line-of-sight path between transmitter and source.” Goodman, 4:43-49; Braithwaite, 1:54-60 (“The IR limitation is that IR is effective in “line of sight only, and the home automation devices to be controlled may be in other rooms.”). Thus, in my opinion, a POSITA would have been motivated to implement Kawamura's Bluetooth remote to advantageously improve communications and successfully

transmit commands to Janevski's PVR even when walls, furniture, people, or other household obstacles obstruct the line-of-sight.

99. In my opinion, a POSITA would have reasonably expected success because Janevski and Kawamura use similar components in similar ways to achieve similar goals, e.g., AV media players, control signals, and remote controllers. *See* Kawamura, [0088]-[0091], [0206]; Janevski, 6:4-44. Moreover, "because Bluetooth is a worldwide standard ... the globalization of communication environments may be promoted with ease." Kawamura, [0011]. Kawamura also uses "a conventional Bluetooth control profile such as AV Remote Control Profile." Kawamura, [0023]. Janevski's "PVR 114a" is also already configured with an Internet network interface ("receiver[] 113a") as explained above. Janevski, 7:57-62; 6:5-16. Thus, implementing Kawamura's Bluetooth remote and interface in Janevski (to the extent not expressly disclosed) would have used known features according to their known functions (remote controls and Bluetooth), to achieve predictable results (Janevski's PVR receives the control function via a Bluetooth interface).

100. In my opinion, Janevski's "receiver" and Kawamura's "Bluetooth interface" meet the construction of "physical component of a device that provides an interconnection with a data network" because they are physical components that connect to the "Internet" and "Bluetooth" networks, respectively. Janevski, 7:57-62; 6:5-16; Kawamura, [0088]-[0091]; EX-1023.

iv. [1aiii] “wherein the first zone player comprises one or more processors and at least one network interface;”

101. In my opinion, [1aiii] would have been obvious over the combination of Janevski and Kawamura. Janevski discloses that “PVR 114a” comprises a “microprocessor 202” (one or more processors) (Janevski, 7:57-62) and a network interface “receiver 113a,” as explained for [1aii] (*Supra* Ground 1, [1aii]). It also would have been obvious to include Kawamura’s “Bluetooth interface” (which is a network interface) in Janevski’s “PVR,” as explained for [1aii]. *Supra* Ground 1, [1aii].

v. [1bi]: “while performing the master device role, the first zone player (i) evaluating one or more operational performance metrics of the one or more processors or the at least one network interface indicating potential degradation in performance of synchronous playback of information content by both the first and second zone player, and”

102. In my opinion, [1bi] would have been obvious over the Janevski-Kawamura system in combination with Muchow. As discussed above, Janevski discloses “PVR 114a” (first zone player) and “PVR 114b” (second zone player), where the “PVR 114a” performs an “initiator” (master) role. *Supra* Ground 1, [1ai]-[1aii]. Janevski also discloses that “the role of initiator [can be] handed off,” but does not disclose doing so as part of a fault tolerant system. *Id.* Janevski confirms that a POSITA would have sought solutions to reduce “synchronization errors” because some are “significant and interfere with viewing enjoyment.” Janevski,

3:40-45. Muchow provides implementation details for a handoff process that makes a system fault tolerant, including performing a handoff based on CPU or network performance to avoid degraded operation (e.g., synchronization errors).

103. Muchow discloses all limitations of [1bi] except that devices are “zone players” and the application is “synchronous playback.” *Id. First*, in Muchow, “[e]ach node executes a ... ‘main task,’” including the **master** node. Muchow, 5:3-14. This “main task” on the master node can incorporate “the functionality of the monitor task.” Muchow, 27:19-21. *Second*, the “monitor task” “**monitor[s]** ... for correct operation” by “**check[ing]**” (i.e., **evaluating**) “**criteria**” (**operational performance metrics**) of “components associated with the node,” such as the “**CPU**” (**processor**) or “**network interface[]**” (**network interface**). Muchow, 4:28-36, 5:3-14, 11:33-42, 26:56-62, 12:11-16, 27:1-21. The master node performs this evaluation because Muchow explains that a “node determines that it should no longer operate as a master.” Muchow; 3:55-60.

104. The “check” in Muchow meets the claimed evaluation. Muchow explains that “the monitor task ... can ... call the operating system to check some operating system criteria.” Muchow, 12:11-16; *see also id.*, 27:1-14 (the “monitor task ... check[s] the value of a sensor” and “check[s] certain performance metrics”). In my opinion, while the ’715 patent’s specification does not use the term “evaluation,” a POSITA would have understood that evaluation is the process of

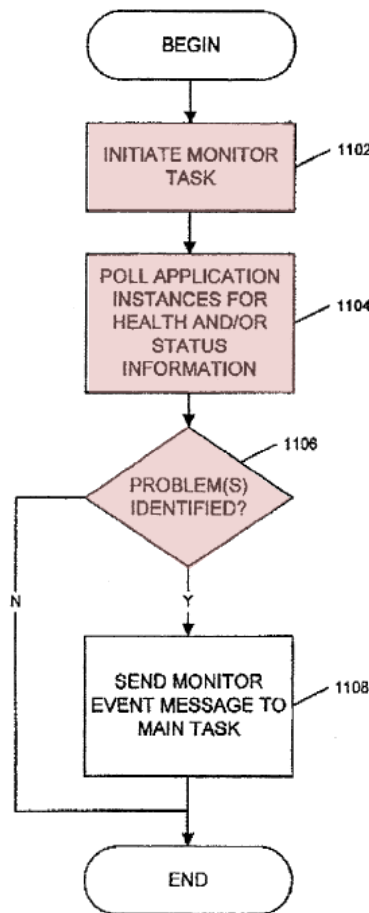
assessing something against a set of standards or benchmarks—known as criteria. Checking whether a criterion is met actively measures the subject’s alignment with that standard. *Id.* This act of comparison constitutes an evaluation. *Id.*

105. Muchow also discloses that the “checked” criteria includes **operational performance metrics** of the one or more **processors** or the at least one **network interface**. *Id.* Muchow determines health and operational status using “criteria,” which disclose operational performance metrics because they (i) “indicate[]” “application instance health,” (ii) “indicate that the operating system is functioning below an acceptable level,” and (iii) indicate that “the application instance is not running properly according to the criteria.” Muchow, 11:33-45, 12:5-18. Exemplary “criteria” include that max temperature and “system throughput.” *Id.*; *see also id.*, 27:1-14 (describing “the value of a sensor that measures the temperature of the node[or] component” and “performance metrics[] such as operating system throughput”).

106. In my opinion, a POSITA would have understood “system throughput” to include—or at least suggest—CPU (i.e., a processor) and network performance in Muchow. This is because its “monitor task can monitor the operation of” “components associated with the node,” including the “CPU.” Muchow, 26:56-62. Although not specifically listed in the exemplary list of monitored “components,” Muchow’s “network interface[]” is also a “component[] associated with the node” because “[e]ach node 102 includes ... one or more external network interfaces.”

Muchow, 4:28-36, 26:56-62 (the exemplary list ends with “etc.”). And “criteria” that indicate the “CPU” “health” or the “network interface[]” “health” and performance correspond to operational performance metrics of one or more **processors** or the at least one **network interface**. *Id.*

107. Muchow also discloses that the purpose of this monitoring is to avoid potential degradation of an application’s performance. To do this, Muchow’s “monitor task” “checks to see how the various application instances in the master state are running” “according to the criteria.” Muchow, 11:33-45. Figure 11 illustrates that “the monitor task polls ... and determines the health and/or operational status” (block 1104) and “determines whether a problem has been identified in block 1104 or otherwise, which indicates that the health and/or operational status of one or more application instances is degraded” (block 1106). Muchow, 27:15-60.



Muchow, FIG. 11.

108. In my opinion, it would have further been obvious that Muchow’s determination “that the health and/or operational status ... [is] degraded” indicated degradation in performance of synchronous playback by both Janevski’s “PVR” “114a” (first zone player) and “114b” (second zone player). Muchow, 27:31-39, 27:49-60; Janevski, 6:13-27. Synchronous playback and receiving audio streams is dependent on both network and processor performance, and thus, degradation of the operational status or health of these components degrades the synchronous playback.

First, Janevski's "microprocessor" manages synchronous playback. *See, e.g.*, Janevski, Abstract ("time is synchronized among the processors that participate in a synchronized viewing session," "content-wise alignment is achieved by means of a status message between processors"), 7:20-24 ("a processor preferably reside[s] in either the PVRs 114a, b" and "programming code associated with the system 110 preferably ... is processed by the processor") Second, Janevski's Internet network interface "receiver 113a" receives audio and video programming from the "Internet" and Janevski's "Internet network" is used "for communicating information between the PVRs 114a, b such that synchronization may be achieved." Janevski, 6:4-38, 6:45-58, 7:57-59; *supra* Ground 1, [1aii].

109. As combined, Janevski's "initiator" "PVR 114a" would have implemented Muchow's "monitor task" to evaluate the "criteria" associated with the "CPU" and "network interface[]." In my opinion, a POSITA would have understood that, as combined, an unacceptably functioning processor indicates the potential degradation in performance of synchronous playback between Janevski's "initiator" and "participant" "PVR" because a processor failure would result in no control over synchronous playback. Muchow, 11:35-42, 12:5-13, 15:5-13, 26:59-61; Janevski, Abstract, 8:53-64, 11:52-13:7 (explaining the processor's role in synchronization). This matches '715 patent claim 2, which defines the "evaluating one or more operational performance metrics of the one or more processors" as "determining that

at least one of the one or more processors of the first zone player is overloaded.”
EX-1001, claim 2.

110. Similarly, in my opinion, a POSITA would have understood that, as combined, an unacceptably functioning network interface indicates the potential degradation in performance of synchronous playback between Janevski’s “initiator” and “participant” “PVR” because it would result in unacceptable communication. Muchow, 4:28-36 (the “network interface allows a node 102 to send and receive messages from an external network 104”). For example, in my opinion, a POSITA would have understood Janevski’s “Internet network” is used “for communicating information between the PVRs 114a, b such that synchronization may be achieved,” and thus adequate network interface operation was required for proper synchronization. Janevski, 6:45-58.

111. In my opinion, a POSITA would have been motivated to combine the Janevski-Kawamura system with Muchow to make a fault tolerant system. Muchow teaches that “it is important to maximize the availability of critical services” which “is achieved by using a fault tolerant system,” such that when one “component fails, the fault is detected, and a redundant component takes over to correct the problem.” Muchow, 1:19-31.

112. In my opinion, a POSITA would have recognized that Janevski’s “microprocessor 202” and Internet network interface (e.g., “received 113a”) were

critical components because of the role they play in synchronous playback and receiving audio and video programming, as explained above in this section. *See, e.g.*, Janevski, Abstract, 6:4-38, 6:45-58, 7:20-24, 7:57-59.

113. In my opinion, a POSITA would have understood that fault tolerant systems were particularly advantageous in Janevski. First, Janevski teaches “characteristic information is used to ‘fine tune’ the synchronization.” Janevski, 5:12-16, 7:41-62, 10:28-30. The “information characteristic” is derived by “a stream characteristic unit” that is “include[d]” in the “microprocessor.” *Id.* In my opinion, a POSITA would have recognized that these additional computational burdens increased the likelihood of overloading Janevski’s “microprocessor.” *Id.* Second, in my opinion, a POSITA would have known that the prevalence of high latency Internet networks at the time, such as dialup Internet, elevated the importance of a fault tolerant system that could correct for spotty internet connection via the network interface.

114. Thus, in my opinion, a POSITA would have sought solutions, as taught by Muchow, to monitor the performance of critical components to correct for faulty initiator PVRs.

115. In my opinion, a POSITA would have reasonably expected success in combining the Janevski-Kawamura system with Muchow because they use similar components in similar ways. For example, “[t]he functions” of Muchow’s

“embodiments can be practiced on a general-or special purpose computer system,” and, in my opinion, a POSITA would have understood this included Janevski’s “PVR” “processor.” Muchow, 29:45-46; Janevski, 7:22-24, 7:57-8:2. Muchow’s embodiments also include running “any type of software program that is executed using a master-slave configuration” such as “time synchronization tasks,” which is a synchronization task like Janevski’s “synchronized PVR viewing” functions. Muchow, 4:36-43; Janevski, 6:5-7, 5:3-19. Muchow also explains that methods to “choose[] a new master from among the available slaves” were known in the art. Muchow, 2:1-21.

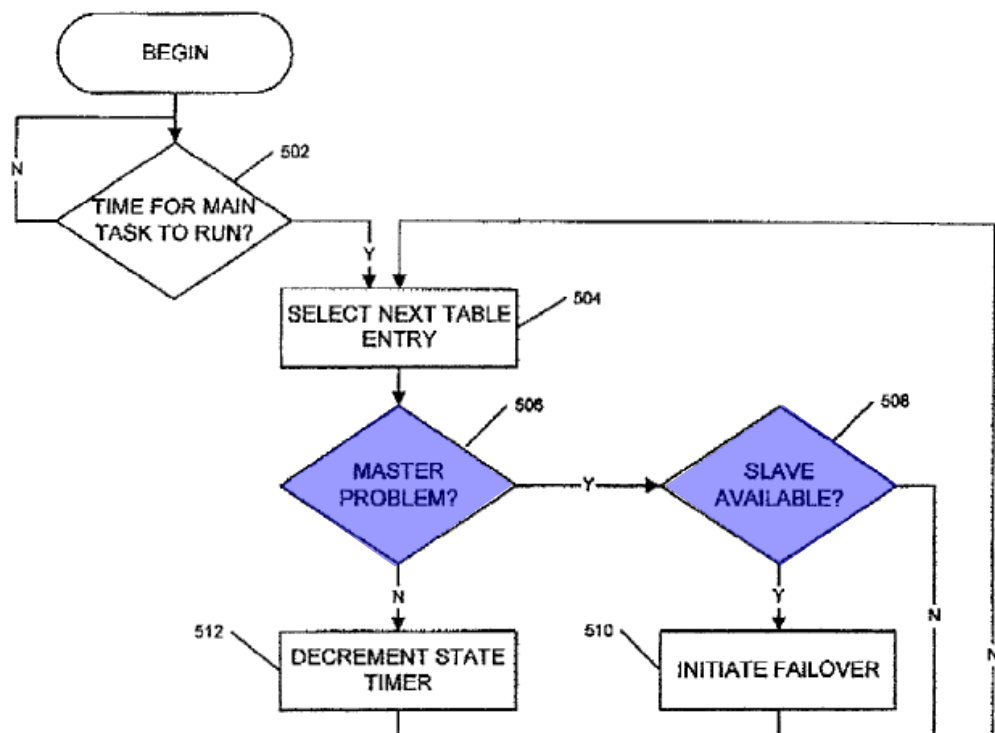
116. In my opinion, implementing this scheme in the Janevski-Kawamura system would have used known features according to their known functions (Janevski’s PVR evaluating CPU or network interface performance (as in Muchow)) to achieve predictable results (Janevski’s initiator PVR determines an issue occurred).

117. In my opinion, a POSITA would have reasonably expected success in combining Muchow into a system including Kawamura’s Bluetooth remote and interface because Muchow and Kawamura modify unrelated elements of Janevski. As discussed above, Kawamura modifies Janevski’s remote controller and one of at least one network interfaces (*supra* Ground 1, [1aii]-[1aiii]), whereas Muchow

modifies management of Janevski's master-slave role failover (*supra* Ground 1, [1bi]; *infra* Ground 1, [1bii]-[1di]).

vi. [1bii] “(ii) based on the evaluation, determining that the second zone player should perform the master device role for the synchrony group;”

118. In my opinion, [1bii] would have been obvious over the Janevski-Kawamura system in combination with Muchow's handover process. As discussed above, it would have been obvious to run the monitor task of Muchow on Janevski's first zone player to improve fault tolerance. *Supra* Ground 1, [1bi]. Muchow's monitor task also discloses which slave device (second zone player in the proposed combination) should take over in response to the current master device failing the evaluation, as illustrated below.



Muchow, FIG. 5 (excerpted).

119. This is further supported by the corresponding disclosure in Muchow:

- “A determination is then made, in block 506, ... whether the monitor result flag (e.g., flag 410, FIG. 4) indicates that a problem has occurred with the master.” Muchow, 14:50-60, 16:7-41.
- “If the flag indicates that a problem has occurred, then a determination is made, in block 508, whether a slave is available to take over the master operations.” *Id.*
- The “monitor result flag 410 ... is used to indicate that a problem has occurred with a master ... [and is] set by the monitor task.” *Id.*

Thus, based on the monitor task’s evaluation (*supra* Ground 1, [1bi]), the “node” “determin[es] ... that a problem has occurred with the master” and that “a slave is available to take over master operations,” which discloses that based on the evaluation, determining that the second node should perform the master role. Muchow, 14:50-60, 16:7-41; *see also id.*, 11:33-12:33.

120. The determination indicates which node should become master because “[i]n one embodiment, the node fails over to the last slave that it received a Heartbeat from.” Muchow, 16:36-38. In other embodiments, the node broadcasts a “[r]esignation message ... with an indication as to which other node should initially attempt to become master” in “an election,” which also discloses the master node

determining that a specific second node should perform the master role. Muchow, 12:19-33.

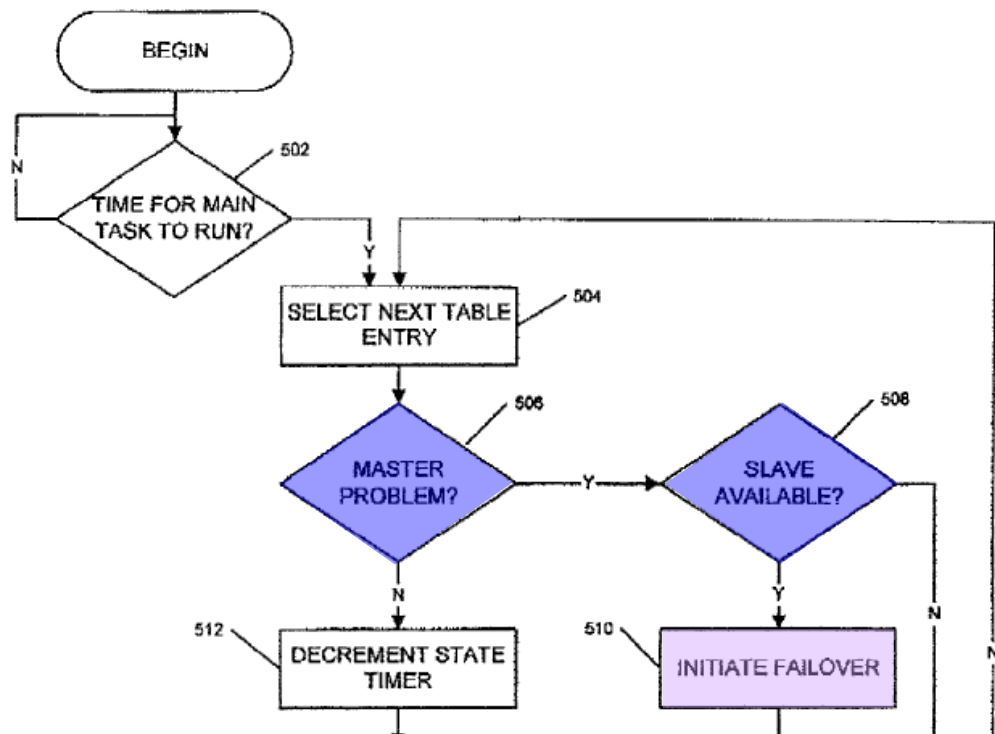
121. As combined, based on evaluation of the “criteria” (as taught by Muchow), Janevski’s “PVR” “114a” would have determined that an “initiator” “PVR” “114a” faulted and that the “participant” “PVR” “114b” should perform the “initiator” role for Janevski’s “synchronized viewing session” (determine that the second zone player should perform the master device role for the synchrony group). *Supra* Ground 1, [1bi]-[1bii]; Muchow, 11:33-12:33, 14:50-60, 16:7-41.

122. In my opinion, the combination of Janevski, Kawamura, and Muchow would have been obvious, as explained above for Ground 1, [1bi]. *Supra* Ground 1, [1bi]. For the same reasons explained above for [1bi], in my opinion, a POSITA would have been motivated to combine the Janevski-Kawamura system with Muchow’s determination of a master problem and reasonably expected success in doing so. *Id.*

vii. [1c]: “in response to **determining that the second zone player should perform the master device role for the synchrony group, the first zone player initiating migration of the master device role from the first zone player to the second zone player; and**”

123. In my opinion, [1c] would have been obvious over the Janevski-Kawamura system in combination with Muchow’s handover process. As discussed above, Muchow’s process runs a monitor task of Muchow on Janevski’s **first zone**

player to improve fault tolerance. *Supra* Ground 1, [1bi]-[1bii]. As shown in the Figure below, Muchow's handover process initiates failover (migration) after determining that the slave (second zone player) is available to take over the master role.



Muchow, FIG. 5 (excerpted). Muchow discloses that “[i]f a slave is available” (in response to determining that the second zone player should perform the master device role) “then the node initiates a failover, in block 510” (first station initiating migration of the master device role). Muchow, 3:55-60, 16:29-41; *see also id.*, 11:33-45, 12:5-33. Muchow’s “initiat[ing] a resignation process,” or “initiat[ing] a failover,” discloses initiating migration of the master device role because “another node will attempt to become the master.” *Id.*

124. This process, while including more implementation detail, is similar to the goals recited in Janevski. Janevski discloses that “participant PVR 114b” can “assume[] the role of initiator PVR 114a,” which discloses the “PVR 114a” (first zone player) migrating the “initiator” (master) to the “PVR 114b” (second zone player). Janevski, 15:38-43. Specifically, the “role is handed off.” Janevski, 6:18-21. As combined, it would have been obvious that a migration is initiated where the “initiator” “role is handed off” (as in Janevski) when Muchow’s “resignation process” “failover” occurs. Janevski, 15:38-43, 6:18-21; Muchow, 3:55-60, 16:29-41.

125. In my opinion, the combination of the Janevski-Kawamura system and Muchow would have been obvious, as explained above for Ground 1, [1bi]-[1bii]. *Supra* Ground 1, [1bi]-[1bii]. For the same reasons explained above for [1bi]-[1bii], in my opinion, a POSITA would have been motivated to combine the Janevski-Kawamura system with Muchow’s initiating migration of the master device role and reasonably expected success in doing so. *Id.*

126. In my opinion, a POSITA would also have been motivated to combine Muchow’s master role migration initiation into the Janevski-Kawamura system to complete the fault tolerant system and enable another “PVR” in Janevski’s system become the “initiator” when the current “initiator PVR” fails. Janevski, 6:18-21, 15:38-43. As explained above, Janevski’s already teaches that the “initiator ... role

is handed off.” *Id.* In my opinion, a POSITA would have further reasonably expected success because implementing this scheme in the Janevski-Kawamura system would have used known features according to their known functions (Janevski’s existing initiator/participant handoff) to achieve predictable results (Janevski’s initiator PVR initiates the existing initiator/participant handoff after determining a fault occurred (as in Muchow)).

viii. [1di]: “after migration of the master device role from the first zone player to the second zone player, the first zone player (i) ceasing to perform the master device role for the synchrony group, and”

127. In my opinion, [1di] would have been obvious over the Janevski-Kawamura system in combination with Muchow’s handover process.

128. As explained for [1c], Janevski discloses that “another participant PVR 114b” can “assume[] the role of initiator PVR 114a.” *Supra* Ground 1, [1c]. When the handoff occurs, the original “initiator PVR 114a” ceases to perform the master role because it “knows that it is no longer the initiator PVR 114a, and a participant PVR 114b ... knows that it is now the initiator PVR 114a.” Janevski, 15:43-47.

129. In my opinion, it would have been obvious that “another participant PVR 114b assumes the role of initiator PVR 114a” and the original “initiator PVR 114a ... knows that it is no longer the initiator PVR 114a” (as in Janevski) after the “Resignation State” “failover” migration (as taught by Muchow). Janevski, 15:38-47; Muchow, 16:29-41; *see also id.*, 3:55-60, 11:33-45, 12:5-33. In my opinion, it

would have been straightforward to apply Muchow's teachings to the Janevski-Kawamura system because Muchow similarly discloses that after a master state hand off (*supra* Ground 1, [1c]), the "node will no longer function as the master." Muchow, 11:60-64, 12:19-33; *see also id.*, 11:33-35 (explaining the "node also may transition out of the Master State 218 if the ... node is or soon will be operating improperly").

130. In my opinion, the combination of the Janevski-Kawamura system and Muchow would have been obvious, as explained above for Ground 1, [1bi]-[1c]. *Supra* Ground 1, [1bi]-[1c]. For the same reasons explained for [1bi]-[1c], in my opinion, a POSITA would have been motivated to combine the Janevski-Kawamura system with Muchow's ceasing to perform the master device role after migration of the master device role and reasonably expected success. *Id.*

ix. [1dii] "(ii) playing back information content in synchrony with the second zone player while the second zone player is performing the master device role for the synchrony group."

131. In my opinion, Janevski discloses [1dii]. After an "initiator"/"participant" handoff (*supra* Ground 1, [1di]), the new "participant" "PVR," which "is no longer the initiator PVR 114a," plays back audio content in synchrony with the "new initiator PVR 114a" (second zone player) that is performing the "initiator" (master) role because "the initiator" "synchronize[s] each participant," which now includes the former PVR 114a. Janevski, 8:45-46; 15:38-

47, Abstract (“The initiator directs all participants, ... to synchronize their playbacks to that of the initiator”); *supra* Ground 1, [1ai]-[1aii] (explaining that the “initiator” “PVR” controls synchronous playback for the “participant” “PVR[s]”).

b. Claims 7 and 13

132. In my opinion, independent claims 7 and 13 are unpatentable for the same reasons as claim 1 because they simply repeat the elements of claim 1 and one additional unpatentable element. The table below highlights the language in claims 7 and 13 that is copied from or substantively identical to claim 1.

Elements of claim 1	Elements of claims 7 and 13
[1aiii]	one or more processors; at least one network interface; and
[1aii]	performing a master device role for a synchrony group comprising the first zone player and a second zone player, wherein in the master device role, the first zone player is configured to control synchronous playback of information content by both the first zone player and the second zone player in response to playback commands received from a controller device via a network interface of the first zone player;
[1bi]-[1bii]	while performing the master device role, evaluating one or more operational performance metrics of the one or more processors or the at least one network interface indicating potential degradation in performance of synchronous playback of information content by both the first and second zone player, and based on the evaluation, determining that the second zone player should perform the master device role for the synchrony group;
[1c]	in response to determining that the second zone player should perform the master device role for the synchrony group,

	initiating migration of the master device role from the first zone player to the second zone player; and
[1di]-[1dii]	after migration of the master device role from the first zone player to the second zone player, ceasing to perform the master device role for the synchrony group, and playing back information content in synchrony with the second zone player while the second zone player is performing the master device role for the synchrony group.

133. Claims 7 and 13 only differ from claim 1 in their preambles and because claim 7 recites elements directed to a non-transitory computer readable medium having instructions encoded therein. The preamble of claim 7, “[a] first zone player comprising,” recites the same “zone player” of element [1ai] and is disclosed for the same reasons. *Supra* Ground 1, [1ai].

134. Claim 7 further recites “**tangible, non-transitory computer-readable media** having instructions encoded therein, wherein the instructions, when executed by the first zone player, cause the first zone player to perform functions comprising.” EX-1001, claim 7. Janevski discloses this limitation because “**PVR 114a** includes ... a **digital memory 206**,” which is a non-transitory computer-readable media, as shown in Figure 2. Janevski, 7:57-8:8. Janevski further discloses that its memory includes instructions that are executed because “[a] memory device and a processor preferably reside in either the PVRs 114a,b” and “programming code associated with the system 110 preferably resides in the memory device and is processed by the processor.” Janevski, 7:20-24.

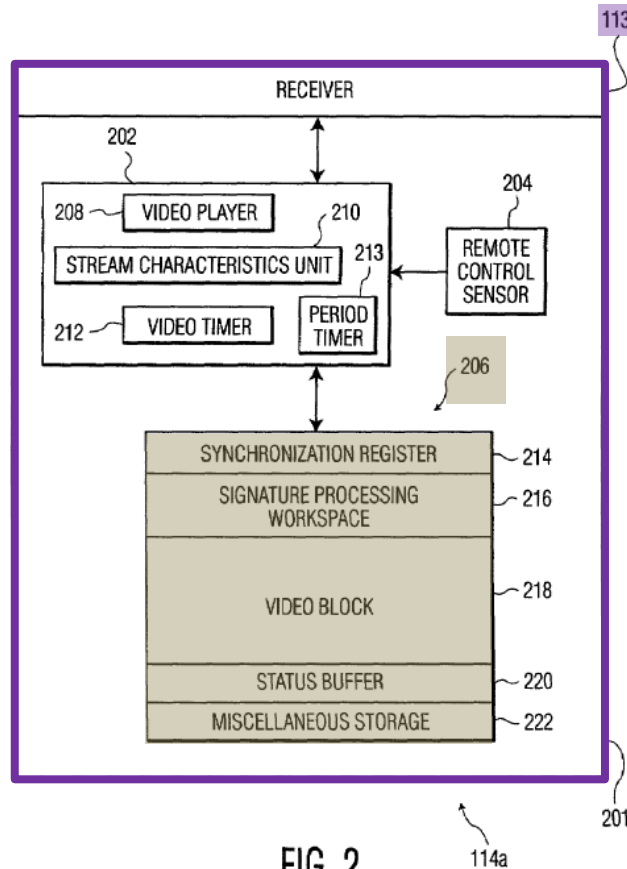


FIG. 2

Janevski, FIG. 2.

135. Claim 13 only differs from claim 7 because the non-transitory computer-readable media with instructions, one or more processors, and at least one network interface are recited in claim 13's preamble rather than in the claim's body. Claim 13's preamble is disclosed and would have been obvious as explained above for claim 7 and for element [1aiii]. *Supra* Ground 1, [1aiii].

B. Ground 2: Claims 1, 7, and 13 Would Have Been Obvious Over Janevski, Boyle, and Kawamura.

136. As part of my analysis, I also considered Patent Owner’s infringement contentions for the ’715 patent. I understand that Patent Owner’s infringement contentions contend that the “operational performance metrics” encompass “metrics related to the wireless signal quality detected by the ... media players,” such as “the Wi-Fi signal strength of each device.” EX-1012 at 3. If Patent Owner’s apparent interpretation of the claim is adopted, then it is my opinion that claims 1, 7, and 13 would have been obvious over Janevski, Boyle, and Kawamura.

1. Boyle (EX-1008)

137. Boyle discloses a method for “determining the rank of all the stations in the network and master transfer means for enabling the station having the highest rank to take the role of master in the network.” Boyle, [0005]. Boyle “is applicable to any [] communication system in which stations are able to form an ad-hoc network.” *Id.*, [0001].

138. Boyle’s system includes “stations,” such as “**master A** and three **slaves A1, A2, A3**” illustrated below. *Id.*, [0014].

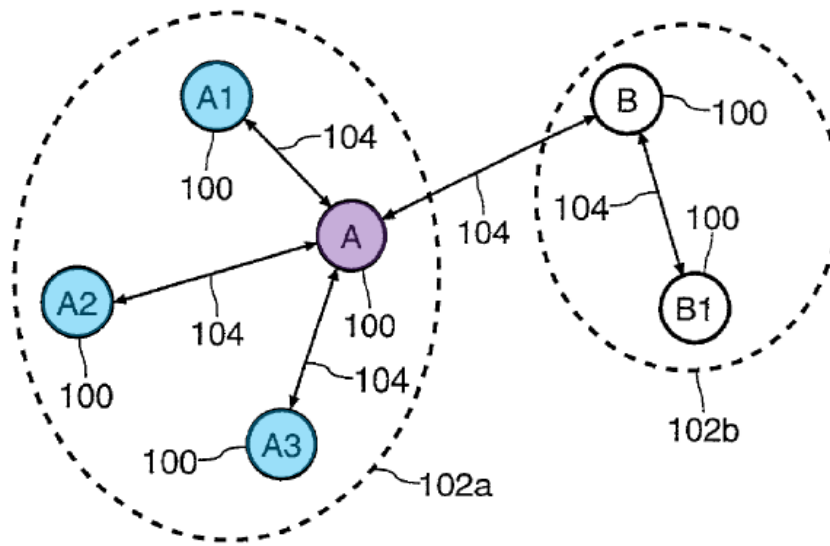


FIG. 1

Id., FIG. 1.

139. The “master station [] request[s] each of the other stations 100 to provide their rankings.” *Id.*, [0024]. “If the master station determines that its ranking is lower than one of its slave stations then it hands over the master role to that station.” *Id.*, [0024].

140. In my opinion, Boyle is in the same technical field as the ’715 patent because it is reasonably pertinent to the problem faced by the inventor: detecting failovers and migrating the master role. *Compare* EX-1001, 8:41-9:4, 10:60-11:4, 13:22-36, 16:3-26, *with* Boyle, Abstract, [0005]-[0007], [0023]-[0024], [0028].

2. Independent Claims

141. As explained above, Janevski teaches most of claim 1, and Kawamura provides a Bluetooth controller. *Supra* Ground 1, claim 1. Boyle plays the same role

as Muchow in Ground 1's combination. *Supra* Ground 1, [1bi]-[1di]; Boyle, [0024]. Like Muchow, Boyle teaches a fault tolerant system that monitors system performance to determine whether to migrate a master role. Boyle, [0007], [0024], [0028]. Under Patent Owner's apparent interpretation of the claims, it is my opinion that claim 1 would have been obvious over the combination of Janevski, Boyle, and Kawamura.

a. Claim 1

i. [1preamble] through [1aiii] and [1dii]

142. In my opinion, Janevski discloses elements [1preamble], [1ai], and [1dii], and elements [1aii] and [1aiii] would have been obvious over the Janevski-Kawamura system, for the reasons explained in Ground 1. *Supra* Ground 1, [1preamble]-[1aiii], [1dii].

ii. [1bi]: “while performing the **master device role, the **first zone player** (i) **evaluating one or more operational performance metrics of the one or more processors or the at least one network interface indicating potential degradation in performance of synchronous playback of information content by both the **first** and **second zone player**, and”****

143. In my opinion, [1bi] would have been obvious over the Janevski-Kawamura system in combination with Boyle. Boyle discloses a “**master station**” (**device** in a **master role**) receives “rankings” from “**slave stations**” (**device in a slave device role**) and, under Patent Owner's apparent interpretation of the claim,

“compare[s]” “rankings” (evaluating operational performance metrics). Boyle, [0007], [0023]-[0024], [0028].

144. Boyle discloses “stations,” such as “master A and three slaves A1, A2, A3” illustrated below. Boyle, [0014]. Boyle’s “master station” discloses a device “performing the role of master.” Boyle, [0003], [0005].

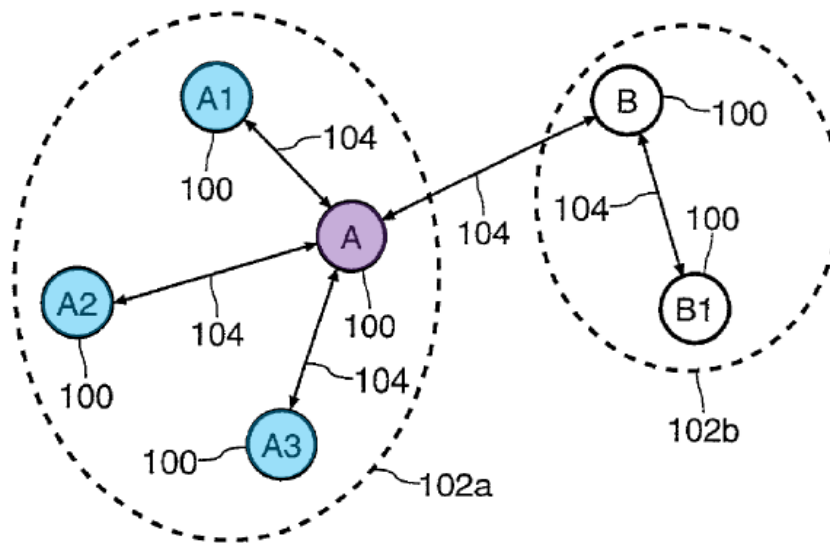


FIG. 1

Boyle, FIG. 1.

145. Boyle discloses that “master station [] request[s] each of the other stations 100 to provide their rankings.” Boyle, [0024]. The “master station” evaluates these “rankings” because it “compare[s]” them. Boyle, [0007], [0024], [0028]. For example, “the master station could compare its ranking with that of the slave station.” *Id.*

146. In my opinion, under Patent Owner’s apparent interpretation of the claim, Boyle’s “rankings” disclose operational performance metrics because they are “antenna rankings,” “for example based on measured VSWR or some other signal quality measure.” Boyle, [0023]. The ranking or quality of an “antenna” or “signal” at least describes operational performance metrics of Boyle’s “antenna” (network interface), which is “for transmitting and receiving radio signals.” Boyle, [0015], [0023]. In my opinion, this is consistent with Patent Owner’s infringement contentions. *See* EX-1012 at 3 (contending that the “operational performance metrics” encompass “metrics related to the wireless signal quality detected by the ... media players,” such as “the Wi-Fi signal strength of each device”).

147. Boyle’s “antenna rankings” indicate potential degradation in performance of synchronous playback of information content by both devices because the “the role of master” is “taken by the station having the highest rank.” Boyle, [0007], [0023]; EX-1012 at 3. If the master station’s ranking drops below that of a slave station, that would indicate the current station is not the “optimum master station,” and therefore “signal quality” is below the optimum level. *Id.* Boyle’s invention operates “to *improve* the operational efficiency of an ad-hoc wireless network.” Boyle, [0004]. This is consistent with Patent Owner’s infringement contentions. EX-1012 at 3.

148. As combined, Janevski's "initiator" "PVR 114a" would have implemented Boyle's "compar[ison]" of "antenna rankings" to identify whether an "initiator" "PVR" "114a" is appropriate to perform the "initiator" master role (evaluating one or more operational performance metrics). Boyle, [0007], [0023]-[0024], [0028]; Janevski, 6:16-21.

149. In my opinion, a POSITA would have been motivated to combine the Janevski-Kawamura system with Boyle's operational performance evaluation, and reasonably expected success in doing so, for the same reasons explained in Ground 1, [1bi]. *Supra* Ground 1, [1bi]. In my opinion, a POSITA would have recognized that Boyle's solution "improv[es] the efficiency of communication in the network." Boyle, Abstract, [0004]. And in my opinion, a POSITA would have been further motivated to combine the Janevski-Kawamura system with Boyle to improve the network communication efficiency between Janevski's PVRs.

150. In my opinion, a POSITA would have reasonably expected success in combining the Janevski-Kawamura system with Boyle because they use similar components in similar ways. Boyle teaches it is "applicable to any [] communication system in which stations are able to form an ad-hoc network," such as Janevski's "synchronized viewing session" which "new participant PVR 114b[s]" can join ad hoc. Boyle, [0001]; Janevski, 7:30-31 ("During the session, viewers may drop out or be added to the session" ad hoc), 11:4-14. Even though Boyle's exemplary

embodiments are described as wireless communication systems, Janevski teaches interconnecting PVRs via the Internet and it would have been well known to use wireless 802.11 connectivity in internetworked systems. Janevski, 6:45-58, 6:6-11; Goldberg, [0350] (explaining “normal Internet connections” include using a “wireless ... 802.11 access point” which connects to an “Internet cloud”). Moreover, Boyle’s “stations” are devices such as “wireless headsets” and “home entertainment equipment,” which a POSITA, in my opinion, would have understood were audio playback devices analogous to Janevski’s PVRs. Boyle, [0013], [0026]-[0027]; Janevski, 6:4-38.

151. In my opinion, implementing Boyle’s method in the Janevski-Kawamura system would have used known features according to their known functions (Janevski’s PVR evaluating network interface performance (as in Boyle)) to achieve predictable results (Janevski’s initiator PVR determines another PVR has better network interface performance).

152. In my opinion, a POSITA would have reasonably expected success in combining Boyle into a system including Kawamura’s Bluetooth remote and interface because Boyle and Kawamura modify unrelated elements of Janevski. Boyle modifies management of Janevski’s master-slave role failover, different than Kawamura. *Supra* Ground 1, [1aii]-[1aiii], Ground 2, [1aii]-[1bi]; *infra* Ground 2, [1bii]-[1di]).

iii. [1bii] “(ii) based on the evaluation, determining that the second zone player should perform the master device role for the synchrony group;”

153. In my opinion, [1bii] would have been obvious over the Janevski-Kawamura system in combination with Boyle.

154. Boyle discloses the “master station” (device in master role), based on evaluating the “rankings” (evaluating operational performance metrics), and “determines that its ranking is lower than one of its slave stations” (determining that the second device should perform the master device role). Boyle, [0023]-[0024].

155. Boyle discloses that based on this “compar[ison],” “[i]f the master station determines that its ranking is lower than one of its slave stations then it hands over the master role to that station,” which discloses determining that the second device should perform the master device role. Boyle, [0024], [0028]. Boyle also explains “the master station could compare its ranking with that of the slave station ... and hand over the master function if required.” *Id.*

156. As combined, based on “compar[ison]” of the “rankings” (as taught by Boyle), Janevski’s “PVR” “114a” would have determined that the “participant” “PVR” “114b” has a higher “antenna ranking” than the original “initiator” “PVR” “114a” such that it should perform the “initiator” role for Janevski’s “synchronized viewing session” (determine that the second zone player should perform the master

device role for the synchrony group). *Supra* Ground 2, [1bi]-[1bii]; Boyle, [0007], [0023]-[0024], [0028].

157. In my opinion, the combination of the Janevski-Kawamura system and Boyle would have been obvious, as explained above for Ground 2, [1bi]. *Supra* Ground 2, [1bi]. For the same reasons explained above for [1bi], in my opinion, a POSITA would have been motivated to combine the Janevski-Kawamura system with Boyle's determination that the slave's antenna ranking is higher than the master's and reasonably expected success in doing so. *Id.*

iv. [1c]: “in response to **determining that the second zone player should perform the master device role for the synchrony group, the first zone player initiating migration of the master device role from the first zone player to the second zone player; and**”

158. In my opinion, [1c] would have been obvious over the Janevski-Kawamura system in combination with Boyle.

159. Boyle discloses “[i]f the master station **determines** that its ranking is lower than **one of its slave stations** then it **hands over** the **master role** to that **station**.” Boyle, [0024]. Therefore, in response to determining that a specific slave station has a higher ranking, Boyle discloses “hand[ing] over,” or initiating migration of, “the master role to that station.” *Id.*

160. As explained for Ground 1, [1c], Janevski discloses that “another participant **PVR 114b**” can “assume[] the role of **initiator PVR 114a**,” which

discloses the “PVR 114a” (first zone player) migrating the “initiator” (master) to the “PVR 114b” (second zone player). *Supra* Ground 1, [1c]; Janevski, 15:38-47. As combined, it would have been obvious that a migration is initiated where the “initiator” “role is handed off” (as in Janevski) when Boyle’s “hand[] over” occurs. Janevski, 15:38-43, 6:18-21; Boyle, [0024].

161. In my opinion, the combination of the Janevski-Kawamura system and Boyle would have been obvious, as explained above for Ground 2, [1bi]-[1bii]. *Supra* Ground 2, [1bi]-[1bii]. For the same reasons explained for [1bi]-[1bii], in my opinion, a POSITA would have been motivated to combine the Janevski-Kawamura system with Boyle’s initiating migration of the master device role and reasonably expected success in doing so. *Id.*

162. Moreover, in my opinion, a POSITA would have been motivated to combine Boyle’s master role migration initiation into the Janevski-Kawamura system to complete the fault tolerant system and enable another “PVR” in Janevski’s system become the “initiator” when the current “initiator PVR” fails, and reasonably expected success in doing so, as explained above for Ground 1, [1c]. *Supra* Ground 1, [1c].

v. [1di]: “after migration of the master device role from the first zone player to the second zone player, the first zone player (i) ceasing to perform the master device role for the synchrony group, and”

163. In my opinion, [1di] would have been obvious over the Janevski-Kawamura system in view of Boyle.

164. As explained for Ground 1, [1di], after handoff, Janevski’s “PVR” ceases to perform the “initiator” role because it “knows that it is no longer the initiator PVR 114a.” *Supra* Ground 1, [1di]; Janevski, 15:38-47.

165. In my opinion, it would have been obvious that “another participant PVR 114b assumes the role of initiator PVR 114a” and the original “initiator PVR 114a ... knows that it is no longer the initiator PVR 114a” (as in Janevski) after “transferring the role of master to a second station” (as taught by Boyle). Janevski, 15:38-47; Boyle, [0006], [0024]. It would have been straightforward to apply Boyle’s teachings to Janevski’s system because Boyle similarly discloses that, after a master role hand off (*supra* Ground 2, [1c]), the station ceases to perform the master role because only “the station (100) having the highest rank in a network (102a, 102b) performs the role of master.” Boyle, Abstract.

166. In my opinion, the combination of the Janevski-Kawamura system and Boyle would have been obvious, as explained above for Ground 2, [1bi]-[1c]. *Supra* Ground 2, [1bi]-[1c]. For the same reasons explained for [1bi]-[1c], in my opinion, a POSITA would have been motivated to combine the Janevski-Kawamura system

with Boyle's ceasing to perform the master device role after migration of the master device role and reasonably expected success in doing so. *Id.*

b. Claims 7 and 13

167. In my opinion, independent claims 7 and 13 are unpatentable for the same reasons as claim 1 because they simply repeat a subset of the elements of claim 1 and one additional unpatentable element, as explained for Ground 1. *Supra* Ground 1, claims 7 and 13.

C. Ground 3: Claims 2, 8, and 14 Would Have Been Obvious Over Janevski in View of Muchow, Kawamura, and Raman.

168. Dependent claims 2, 8, and 14 require evaluating a processor overload. Raman discloses this feature, and in my opinion it would have been obvious to include in the Janevski-Kawamura-Muchow system.

1. Raman (EX-1009)

169. Raman relates to a “failover manager that operates within a data communications device” in the context of “audio or video data.” Raman, 3:17-47. Raman discloses “detecting ... the failure or incapacity of the first stream server to effectively serve the stream data to the client computer system” and establishing transmission between a second stream server and the client. *Id.* One failover taught by Raman occurs when “processing burdens required to serve such streams [] overload the first stream server.” *Id.*, 17:65-18:1.

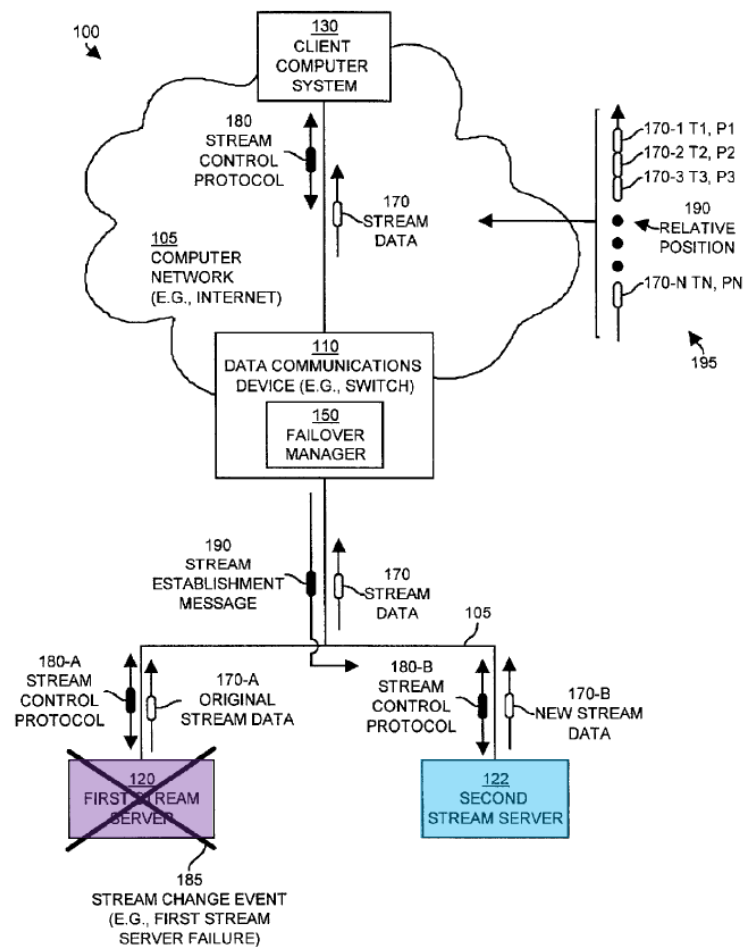


FIG. 1

Raman, FIG. 1, 8:52-55, 9:35-50.

170. In my opinion, Raman is in the same technical field as the '715 patent because it is reasonably pertinent to the problem faced by the inventor: detecting failovers in operational performance and migrating devices. *Compare* EX-1001, 8:41-9:4, 10:60-11:4, 13:22-36, 16:3-26, *with* Raman, 3:17-47.

2. Dependent Claims

- a. **Claims 2, 8, and 14: “wherein while performing the master device role, evaluating one or more operational performance metrics of the one or more processors or the at least one network interface indicating potential degradation in performance of synchronous playback of information content by both the first and second zone player comprises the first zone player determining that at least one of the one or more processors of the first zone player is overloaded.”**

171. In my opinion, claims 2, 8, and 14 would have been obvious over the Janevski-Muchow-Kawamura system in view of Raman. Raman discloses “detect[ing] an overload” (determining a processor is overloaded) of a “first stream server” and migrating to a “second stream server.” Raman, 3:28-32, 12:2-12.

172. Raman discloses a “failover manager 150” that “may detect an overload.” Raman, 11:63-66, 17:63-65. “[T]he failover manager 150 includes an event detector 156” and the “event detector 156 ... detect[s] that the first stream server 120 indicates an overload for serving stream data.” Raman, 14:1-17, 17:65-18:1. For example, the “processing burdens required to serve such streams may overload the first stream server 120.” Raman, 17:65-18:1. Raman’s “indicat[ing] an overload” caused by the “processing burdens” discloses determining that one or more processors is overloaded because “processing burdens” are the burdens on a processor. *Id.*

173. As combined, Janevski's "initiator" "PVR" would have evaluated operational performance metrics (as taught by Muchow), and one of those operational performance metrics would have been whether the processing burdens are too high (as taught by Raman) for the current "initiator" "PVR" processor.

174. In my opinion, a POSITA would have realized the advantage of ensuring the "processing burdens" were manageable for the initiator (master) PVR in Janevski to avoid failure, as taught by Raman. Raman, 17:65-18:1; Janevski, 7:36-41. And in my opinion, a POSITA would have been motivated to combine the Janevski-Kawamura-Muchow system with Raman to improve on Muchow's techniques by evaluating additional important operational criteria of the processor, including Raman's "processing burdens" indicating "overload." Raman, 17:65-18:1. When addressing the problem of processor failovers, a POSITA in my opinion logically would have sought references describing commonplace processor failovers in streaming systems, such as Raman describes overloaded processing burdens.²

175. In my opinion, a POSITA would have reasonably expected success in implementing Raman's measurement of "processing burdens" in the Janevski-Kawamura-Muchow system because it requires no more than the straightforward

² Sonos admitted that Janevski is "similar" to other references "configured to receive and render video content broadcasts ..." EX-1020 at 70.

application of Muchow's teachings, which already evaluate criteria, to evaluate an additional criterion. *Supra* Grounds 1/2 [1bi]-[1c]; Raman, 17:65-18:1. Thus, using Raman's measurement of processing burdens to determine that a PVR serving as the initiator (master role) had an overloaded processor would have used known features according to their known functions (Muchow's techniques for assessing operational performance metrics and Raman's "processing burdens" criteria), to achieve predictable results (Janevski's initiator PVR compares Raman's "processing burdens" like the parameters already assessed in Muchow).

176. In my opinion, a POSITA would have reasonably expected success in combining Raman into a system including Kawamura's Bluetooth remote and interface because Raman and Kawamura modify unrelated elements of Janevski. Raman provides evaluating a specific operational performance criterion, different than Kawamura. *Supra* Grounds 1/2, [1aii]-[1aiii]).

D. Grounds 4A/4B: Claims 3, 9, and 15 Would Have Been Obvious Over Janevski in View of Muchow, Kawamura, and Roy and Over Janevski in View of Boyle, Kawamura, and Roy.

177. Dependent claims 3, 9, and 15 further evaluate a network latency metric. Roy discloses this feature, and in my opinion it would have been obvious to include in the Janevski-Kawamura-Muchow system and Janevski-Kawamura-Boyle system.

1. Roy (EX-1010)

178. Roy “pertains to ... reducing latency when synchronizing access to a multi-user database over a network.” Roy, 1:5-9. Roy’s system includes “a first event server” and “a second event server.” Roy, 2:2-5. Roy discloses “changing the status of the first event server from master event server to slave event server based on a network latency criterion, and assigning the status of master event server to the second event server based on the network latency criterion.” Roy, 2:5-10.

179. In my opinion, Roy is in the same technical field as the ’715 patent because it is reasonably pertinent to the problem faced by the inventor: reducing network latency by migrating the status of master and slave devices. *Compare* EX-1001, 10:66-11:4, claims 3, 9, 15, *with* Roy, 1:5-9, 1:19-26, 1:46-2:10.

2. Dependent Claims

- a. **Claims 3, 9, and 15: “wherein the one or more operational performance metrics comprise a network latency metric, and wherein while performing the master device role, the first zone player evaluating one or more operational performance metrics of the one or more processors or the at least one network interface indicating potential degradation in performance of synchronous playback of information content by both the first and second zone player comprises the first zone player determining that migrating the master device role from the first zone player to the second zone player would improve latency of message transmission within the synchrony group.”**

180. In my opinion, claims 3, 9, and 15 would have been obvious over the Janevski-Muchow-Kawamura and Janevski-Boyle-Kawamura systems in view of Roy. Roy discloses a “network latency criterion,” which is a network latency metric because it indicates tolerable latency within the network. *Id.* For example, Roy’s “master event server” can determine whether a slaves “role requires the lowest latency,” and thus “relinquish its status as master” to minimize latency. Roy, 7:26-42, 8:41-51. The “latency” is latency of message transmission, as claimed, because Roy describes the invention in the context of “latency in communicating data between computers.” Roy, 1:23-26.

181. Roy further discloses “changing the status of the first event server from master event server to slave event server based on a network latency criterion and assigning the status of master event server to the second event server based on the

network latency criterion.” Roy, 2:5-10. This migration improves latency because “a key feature of the present invention is that the master event server and the master database are migrated to another machine in order to *minimize latency*.” Roy, 7:26-30. For example, Roy teaches “determine[ing]” “which computer system participating in the game ... ha[s] the role which requires the *least latency*,” and “the master event server 66 is migrated” to that machine so that the master is the device with the lowest latency, thus improving latency. Roy, 5:65-6:2.

182. In my opinion, a POSITA would have been motivated to combine the Janevski-Kawamura-Boyle system and the Janevski-Kawamura-Muchow system with Roy to “minimize latency” by evaluating a “network latency criterion” and migrating the initiator role to the PVR having the “least latency,” as taught by Roy. Roy, 2:5-10, 5:65-6:2, 7:26-30; Janevski, 6:4-38, 15:32-47. Doing so would have advantageously improved user experience by reducing communications delays. *Id.*

183. Roy teaches a “problem” in the art is that systems “designed for multiple players using different computers tend to be sensitive to latency in communicating data between computers.” Roy, 1:19-26. In my opinion, a POSITA would have understood this problem also applied to Janevski where multiple PVRs communicate data and playback audio and video in synchrony, as explained above in Ground 1, [1aii]. *Supra* Ground 1, [1aii]. In my opinion, a POSITA would have

known that latency was a well-known problem in data communications and sought to address it.

184. In my opinion, a POSITA would have recognized the importance of monitoring latency as applied to Janevski because the initiator PVR controls synchronous playback by transmitting timing information to the participant devices (*supra* Ground 1, [1aii]; *infra* Ground 5A/5B, [5c]). Ensuring tolerable network latency would have advantageously ensured the timing information is not out of date when it reaches the participants PVRs. When addressing the problem of network interface performance, in my opinion, a POSITA logically would have sought references describing commonplace network interface failures, such as Roy's network latency criterion.³

185. In my opinion, a POSITA would have reasonably expected success in implementing Roy's "network latency criterion" in the Janevski-Kawamura-Muchow system and Janevski-Kawamura-Boyle system because it requires no more than the straightforward application of Muchow's and Boyle's teachings, which already teach evaluating criteria, to evaluate an additional criterion. *Supra* Grounds 1/2, [1bi]-[1c]; Roy, 2:5-10. In my opinion, implementing Roy's "network latency

³ Sonos admitted that Janevski is "similar" to other references "configured to receive and render video content broadcasts ..." EX-1020 at 70.

criterion” would have used known features according to their known functions (Muchow’s or Boyle’s techniques for assessing operational performance metrics evaluating Roy’s additional criterion), to achieve predictable results (Janevski’s initiator PVR evaluates which PVR has the lowest network latency).

186. In my opinion, a POSITA would have reasonably expected success in combining Roy into a system including Kawamura’s Bluetooth remote and interface because Roy and Kawamura modify unrelated elements of Janevski. Roy provides evaluating a specific operational performance criterion, different than Kawamura. *Supra* Grounds 1/2, [1aii]-[1aiii].

E. Grounds 5A/5B: Claims 5, 11, and 17 Would Have Been Obvious Over Janevski in View of Muchow, Kawamura, and Goldberg and Over Janevski in View of Boyle, Kawamura, and Goldberg.

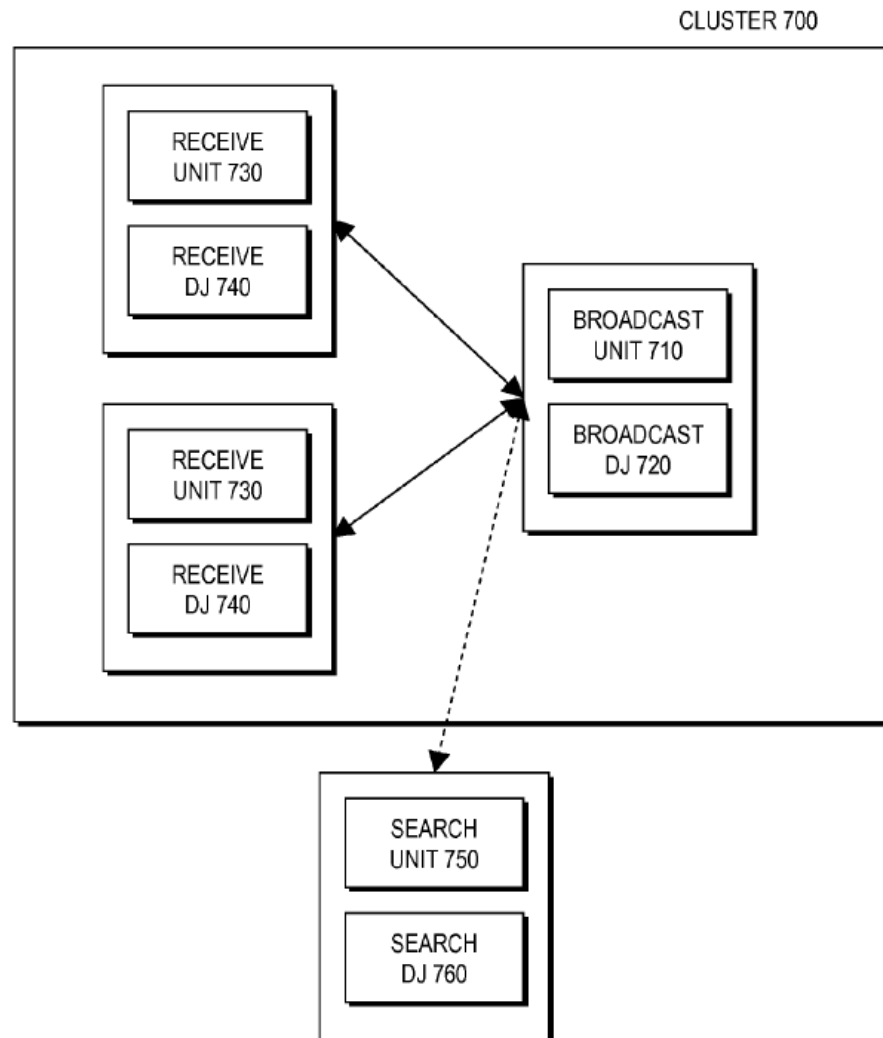
187. Dependent claims 5, 11, and 17 further require transmitting a network address, audio information, and timing information. Janevski discloses audio information and timing information. Goldberg discloses a network address and audio information, and in my opinion it would have been obvious to include these in the Janevski-Kawamura-Muchow system and Janevski-Kawamura-Boyle system.

1. Goldberg (EX-1011)

188. Goldberg “relates to localized wireless audio networks for shared listening of recorded music.” Goldberg, 1:10-13, 6:14-23. Goldberg’s system includes “the broadcast unit 710 and the receive units 730,” as well as “search units

750.” *Id.*, 30:15-20, 36:18-26. “[T]he audio playback on the broadcast unit 710 and the receive units 730 [is] highly synchronized.” *Id.* Goldberg’s units are “audio devices.” *Id.*, 29:14-21, 76:27-77:9. Figure 6 illustrates these units:

Fig. 6



Id., FIG. 6.

189. To ensure that all devices have audio for playback, Goldberg discloses that “[i]f the music file is not present [at a receive unit], then transfer of the music file from the broadcast unit to the receive units can automatically proceed through a file transfer mechanism such as peer-to-peer transfer.” *Id.*, 39:30-32. Moreover, Goldberg discloses that “[i]f the search unit 750 user requests permission to join the cluster 700 ..., the broadcast unit 710 can then provide ... to the search unit 750 ... a private IP address for multicasting.” *Id.*, 56:15-33.

190. In my opinion, like the ’715 patent, Goldberg is in the technical field of controlling synchronous audio playback. *Compare* EX-1001, 1:25-45, 2:35-48, 5:33-39, *with* Goldberg, 6:14-23, 36:17-40:16, 40:33-41:28.

2. Dependent Claims

a. Claims 5, 11, and 17:

i. [5a], [11a], and [17a]: “wherein the first zone player performing the master device role for the synchrony group comprises the first zone player transmitting to at least the second zone player: (i) a network address that the first zone player uses to transmit audio information,”

191. In my opinion, [5a], [11a], and [17a] would have been obvious over the Janevski-Muchow-Kawamura and Janevski-Boyle-Kawamura systems in view of Goldberg. Goldberg discloses a “broadcast unit 710” (first zone player) “provid[es] a private IP address for multicasting” (transmitting a network address) to a “search unit 750” (second zone player). Goldberg, 56:15-33, 58:3-6. Goldberg’s units are “audio devices.” Goldberg, 29:14-21, 76:27-77:9. Specifically, Goldberg’s

“broadcast unit 710 can ... provide a private IP address for multicasting” “to the search unit 750,” which discloses to a first zone player transmitting a network address to the second zone player. Goldberg, 56:15-33, 58:3-6. An “IP address” is a network address because it is an address in an Internet network. *Id.* Goldberg’s “IP address” discloses the address the “broadcast unit 710” uses to transmit audio information because the “multicasting” is for “audio multicasting,” which is audio information transmission. *Id.*

192. As combined, Janevski’s “PVR” “114a” would have transmitted Goldberg’s “IP address for multicasting” to Janevski’s “PVR” “114b” for multicasting. Janevski, 6:45-51; Goldberg, 56:15-33, 58:3-6.

193. In my opinion, a POSITA would have recognized that Janevski’s initiator PVR communicates data (e.g., status messages) to a group of participant PVRs when “[m]ore than two users [] participate in a synchronized viewing session.” *Supra* Grounds 1/2, [1ai]-[1aii]; *infra* Grounds 5A/5B, [5b]-[5c], Grounds 6A/6B, [6a]; Janevski, 6:45-51, 7:25-30. Janevski explains that whenever a user executes a “control function,” that user’s PVR (which can be the initiator PVR, *supra* Ground 1, [1aii]) “broadcasts a command” to “the PVR 114b of each participant, to keep the presentation synchronized.” Janevski, 7:31-36, 7:47-50 (using “message recipients’ PVR 114b” plural confirms each participant PVR receives the status message). In my opinion, a POSITA would have been motivated to combine

advantageous solutions for communicating data to groups of devices into the Janevski-Kawamura-Muchow and Janevski-Kawamura-Boyle systems, as taught in Goldberg's "well-established IP protocols" and "multicasting." Goldberg, 56:15-33, 82:8-16. Indeed, in my opinion, a POSITA would have understood that Janevski's "broadcast[]" at least suggests a multicast. Janevski, 7:31-36.

194. In my opinion, a POSITA would have known that "a multicast service offers significant advantages," especially for data communication to Janevski's collective group. The prior art explains that "[t]he most obvious advantage is seen from the perspective of bandwidth usage," and "[a]nother advantage of multicast is the group abstraction ... [that] often simplifies the design and implementation of distributed systems." Grossglauser, 6:13-32.

195. In my opinion, a POSITA would have reasonably expected success in combining the Janevski-Kawamura-Muchow system and Janevski-Kawamura-Boyle system with Goldberg because they implement similar components to achieve similar goals. For example, Janevski and Goldberg both teach transmitting information between two audio devices to enable synchronous playback. *Supra* Grounds 1/2, [1aii]; *infra* Grounds 5A/5B, [5b]-[5c]; Goldberg, Abstract, 39:30-40:10. Moreover, multicasting was known, as explained above. Grossglauser, 6:13-32; *see also* Champagne, 1:15-2:40; Grundstrom, 1:5-2:35 (explaining "multicast networks" and "multicast IP address[es]" where known).

196. Like Janevski and Goldberg, Muchow involves “computer system[s]” where nodes transmit data amongst each other (e.g., “send and receive messages from an external network”). Muchow, 4:28-43, 29:45-46. Also like Janevski and Goldberg, Boyle implements audio devices (“wireless headsets” and “home entertainment equipment”) which transmit data amongst each other (e.g., the master “transmits” a “paging message”). Boyle, [0001], [0013], [0026]-[0028].

197. Implementing Goldberg’s IP address transmission in Janevski would have used known features according to their known functions (Janevski’s existing network and known multicast IP addresses), to achieve predictable results (Janevski’s PVR 114b transmits an IP address to PVR 114b, as taught by Goldberg).

198. In my opinion, a POSITA would have reasonably expected success in combining Goldberg into a system including Kawamura’s Bluetooth remote and interface and Muchow’s/Boyle’s management of Janevski’s master-slave role failover because Goldberg, Kawamura, Muchow, and Boyle modify unrelated elements of Janevski. Goldberg modifies the data communicated between Janevski’s PVRs, different than Kawamura, Muchow, or Boyle. *Supra* Grounds 1/2, [1aii]-[1di]).

ii. [5b], [11b], and [17b]: “(ii) audio information, and”

199. In my opinion, Janevski discloses [5b], [11b] and [17b]. And in my opinion, [5b], [11b], and [17b] would have been obvious over the Janevski-Muchow-Kawamura system and Janevski-Boyle-Kawamura system in view of Goldberg.

200. As explained for [1aii], Janevski discloses “a status message is sent out periodically by the ‘initiator’, i.e., the PVR 114a that initiated the session” (first playback device performing the master device role). Janevski, 7:36-50; *supra* Ground 1, [1aii]. This “status message” is received by “message recipients’ PVR 114b” (second playback device). *Id.*

201. Janevski further discloses that this “status message includes ... information characteristic of content of a digital bit stream,” which discloses audio information. Janevski, 7:41-50. For example, Janevski discloses comparing “corresponding content or ‘landmarks’ of pairs of video playbacks to be synchronized.” Janevski, 3:52-57. This “characteristic information may be characteristic of ... audible sounds” and Janevski discloses that “audio transform coefficients” “can be used to characterize the content of the bit streams.” Janevski, 16:38-43.

202. In my opinion, a POSITA would have understood that “audio transform coefficients” are computed from frames of audio samples and are part of the compressed audio stream. *Id.* The prior art explains that an “audio signal” is

“transformed from the time domain ... to another domain that facilitates analysis” and “[t]he transformation produces a set of amplitude coefficients of a variable other than time, typically frequency.” Lim, 2:11-16, 2:45-47. Therefore, audio transform coefficients are audio information. *Id.* This is consistent with the ’715 patent specification which explains that audio information can be less than the full content for playback because, for example, “each frame compris[es] digital audio information for a predetermined period of time.” EX-1001, 19:49-53.

203. To the extent audio information means the full content for playback, it would have been obvious to modify Janevski’s “initiator” “PVR” “114a” to transmit the “broadcast” to the “participant” “PVR” “114b” if it did not already have the broadcast recorded. Janevski, 6:13-38, 6:45-51, 6:59-7:3.

204. Goldberg discloses that “[i]f the music file is not present, then transfer of the music file from the broadcast unit to the receive units can automatically proceed through a file transfer mechanism such as peer-to-peer transfer.” Goldberg, 39:30-40:2. Goldberg’s “music file” discloses audio information. *Id.*

205. As combined, Janevski’s “initiator” “PVR” “114a” would have transmitted Goldberg’s “music file” to the “participant” “PVR” “114b” if it did not already have the broadcast program downloaded. Janevski, 6:45-7:3; Goldberg, 39:30-40:2.

206. In my opinion, it would have been obvious to combine the Janevski-Kawamura-Muchow system and Janevski-Kawamura-Boyle with Goldberg, as established above for Ground 5A/5B, [5a]. *Supra* Ground 5A/5B, [5a]. In my opinion, a POSITA would have been motivated to implement Goldberg's audio file transfer to advantageously allow two PVRs to synchronously playback programming that one of the PVRs did not previously record. Goldberg, 39:30-40:2. In my opinion, a POSITA would have recognized that Janevski expressly teaches that "[a]lthough [] copies of video 308 are described as recorded from broadcasts, this is not a limitation," and "[t]he video copies could be downloaded from a service provider." Janevski, 16:10-16. Moreover, Janevski teaches that "[t]he video copies whose playback is being synchronized need not be remotely located, nor locally located at their respective PVRs." *Id.* In my opinion, a POSITA would have sought solutions for retrieving audio copies where the second PVR had not previously recorded a copy. *Id.* Goldberg teaches such a solution by allowing one of Janevski's second PVR to download the content from the first PVR. *Id.*

207. In my opinion, a POSITA would have reasonably expected success in combining the Janevski-Kawamura-Muchow system and Janevski-Kawamura-Boyl with Goldberg because they disclose similar systems, as explained for Grounds 5A/5B, [5a]. *Supra* Grounds 5A/5B, [5a]. The expectation of success would have been heightened because Janevski already teaches that "copies could be downloaded

from a service provider” and “need not be ... locally located at their respective PVRs.” Janevski, 16:10-16. Thus, Janevski contemplates its system succeeding with a wide variety of video and audio sources, specifically including “download[ing].” *Id.* Janevski and Goldberg also both apply to transmitting video and/or audio information. *Compare* Janevski 5:9-12, 16:33-43 (“The presentation may be merely visual or merely aural or both visual and aural”) *with* Goldberg, 76:10-25 (the units of “the present invention” can “comprise video or audio/visual players”). Thus, implementing Goldberg’s scheme in the Janevski-Kawamura-Muchow and Janevski-Kawamura-Boyle systems would have used known features according to their known functions (transmitting audio information, e.g., over the Internet), to achieve predictable results (Janevski’s participant PVR downloads the audio information).

iii. [5c], [11c], and [17c]: “(iii) playback timing information for audio information.”

208. In my opinion, Janevski discloses [5c], [11c], and [17c]. Janevski discloses an “initiator” (master) “PVR” “114a” (first zone player) “sen[ding]” or “transmit[ing]” (transmitting) to the other “PVRs” (second zone player) “an indication of the time into the program” (timing information). Janevski, 7:36-50.

209. As explained for [1aii], Janevski discloses “a status message is sent out periodically by the ‘initiator’, i.e., the PVR 114a that initiated the session” (first

playback device performing the master device role). Janevski, 7:36-50; *supra* Ground 1, [1aii]. This “status message” is received by “message recipients’ PVR 114b” (second playback device). *Id.*

210. Janevski further discloses that this “status message” includes an “indication of the time into the program,” which discloses playback timing information for audio information because “the destination PVR can take corrective action to compensate for” timing differences and “fast forward” to “catch up content-wise with that of the sender.” Janevski, 2:23-45, 7:36-50. Janevski discloses an “aural” broadcast, confirming that the “indication of the time into the program” is playback timing information for audio information. Janevski, 7:36-50; 16:34-43.

211. In my opinion, this timing indication meets the construction of “information indicating when the audio [information / content] is to be played back” because the timing indication is, for example, an “output time stamp 1 hour, 1 minute and 2 seconds” into the program which the “destination PVR” matches. Janevski, 2:23-45, 7:36-50; EX-1023.

F. Grounds 6A/6B: Claims 6, 12, and 18 Would Have Been Obvious Over Janevski in View of Muchow, Kawamura, and Lord and Over Janevski in View of Boyle, Kawamura, and Lord.

212. Dependent claims 6, 12, and 18 further add a third zone player to the synchrony group. Lord discloses this feature, and in my opinion it would have been

obvious to include in the Janevski-Kawamura-Muchow system and Janevski-Kawamura-Boyle system.

1. Lord (EX-1006)

213. Lord matured from U.S. Patent App. Ser. No. 09/894,060 and is expressly incorporated by reference into Janevski. Janevski, 1:53-60; Lord, Cover Page.

214. Like Janevski, Lord relates to “techniques for synchronizing the video output of personal video recorders in two or more locations.” Lord, 1:5-9, 2:39-59. Lord’s system includes “personal video recorders 14-1 and 14-2” and discloses “[r]emote controls 16-1 and 16-2” for operating the PVRs. *Id.*, 3:6-12, 3:25-30.

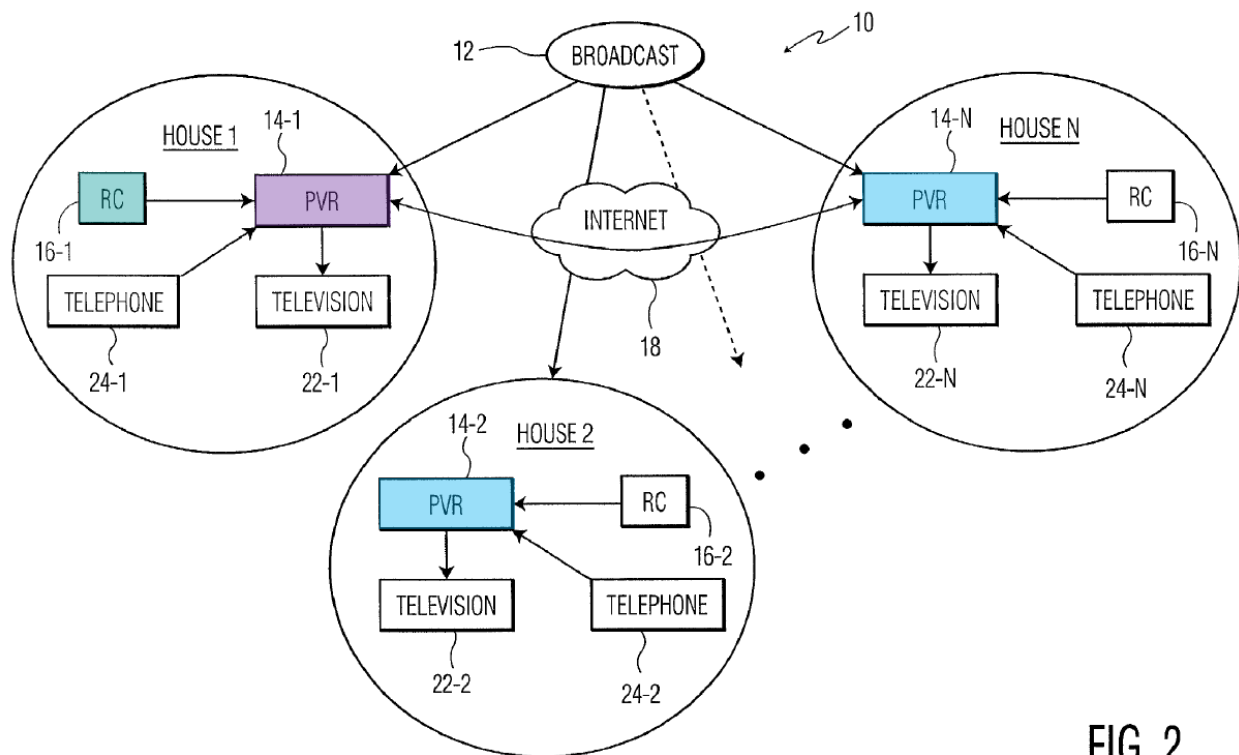


FIG. 2

Id., FIG. 2.

215. Lord discloses a “buddy list” that includes options to “select to join in on what the buddy is watching,” which can be implemented with more than two users. *Id.*, 6:6-15. Figure 9 illustrates an exemplary “buddy list.” *Id.*, 5:10-27. If a user “accepts the offer,” then the users watch synchronized programming. *Id.*

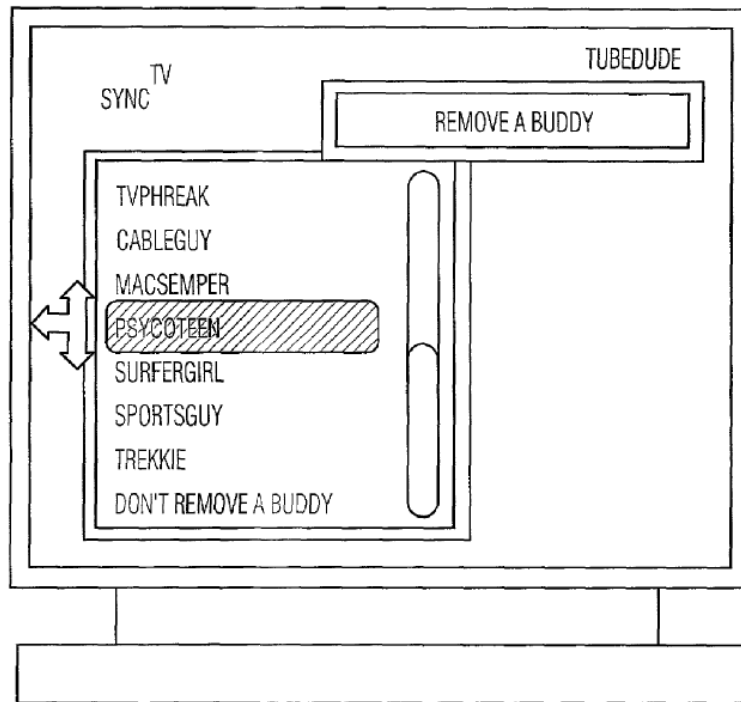


FIG. 9

Id., FIG. 9.

216. In my opinion, like the '715 patent, Lord is in the technical field of controlling synchronous audio playback. *Compare* EX-1001, 1:25-45, 2:35-48, 5:33-39, *with* Lord, 1:1-9, 1:50-56, 2:20-22.

2. Dependent Claims

a. Claims 6, 12, 18:

i. [6a], [12a], [18a]: **“the first zone player receiving control information from a controller device, wherein the control information indicates that a third zone player should be added to the synchrony group; and”**

217. In my opinion, [6a], [12a], and [18a] would have been obvious over the Janevski-Kawamura-Muchow system and Janevski-Kawamura-Boyle system in combination with Lord.

218. Janevski discloses a third PVR (third zone player) because it “allows two or more people with personal video recorders (PVRs) to precisely synchronize their time-shifted viewing.” Janevski, 5:3-5.

219. In my opinion, a POSITA would have been motivated to seek solutions for adding new viewers to existing sessions because Janevski expressly contemplates that “[d]uring the session, viewers may ... be *added to the session*.” Janevski, 7:30-31.

220. Lord, which is expressly incorporated by reference in its entirety into Janevski, teaches a “buddy list” for joining synchronized viewing sessions, as illustrated in Figure 9. Lord, 5:10-27. The buddy system allows users to request to join a session: “[o]nce [a] User 1 selects the name on the buddy list that is associated with User 2, a message appears on User 2’s screen that User 1 wants to watch

television in a synchronized manner.” *Id.* Next, “User 2 is given the option of accepting or declining the offer made by User 1.” *Id.*

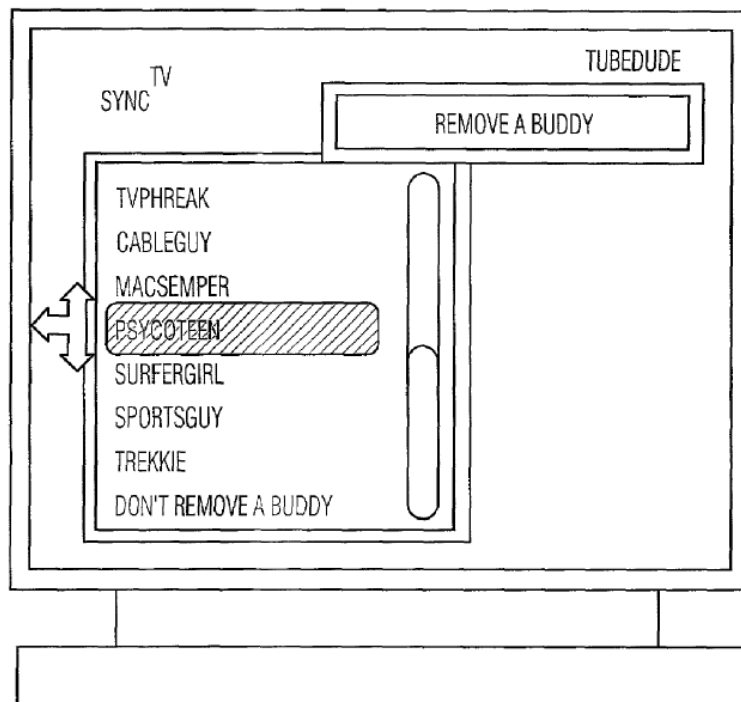


FIG. 9

Lord, FIG. 9.

221. Lord teaches that with “more than two users[,] ... a mechanism similar to the buddy lists discussed above can be implemented” such that “if you are on someone else’s buddy list, at any time you can investigate what that buddy is watching and select to join in on what the buddy is watching (*possibly as part of an existing collective*).” Lord, 6:6-15.

222. In my opinion, a POSITA would have understood that, in the context of a collective three users, User 1 would have received an on “screen” “offer” “message” from a third User 3 to watch television in a synchronized manner, like the “offer” received from User 2 in the example above. Lord, 5:20-27. In my opinion, a POSITA would have understood that User 1 accepting this on “screen” “offer” “message” from User 3 discloses control information indicating that User 3’s PVR (third zone player) should be added to the session because it instructs User 1’s PVR (first zone player) to add a third “buddy” PVR to “an existing collective” (synchrony group). Lord, 5:20-27, 6:6-15.

223. Finally, in my opinion, a POSITA also would have understood that Lord’s “accept[ance]” of the on “screen” “offer” “message” was received by the first PVR from a controller device because the user uses the “[r]emote control ... to operate the personal video recorder.” Lord, 2:22-30, 3:25-30, 4:16-23, 5:20-27, 6:6-15, 7:50-56.

224. In my opinion, a POSITA would have been motivated to combine Lord’s buddy system into the Janevski-Kawamura-Muchow and Janevski-Kawamura-Boyle systems at least because Janevski incorporates Lord by reference and notes that “[a] series of menus for establishing a viewing session are discussed in U.S. patent application Ser. No. 09/894,060 [Lord].” Janevski, 1:53-57, 7:18-20.

225. In my opinion, a POSITA would have been motivated to make this combination to achieve Janevski's expressly stated goal of allowing users to "be *added to the session*." Janevski, 7:30-31. Moreover, Lord teaches several advantages to allowing a user to accept or decline the offers of those seeking to join the user's viewing sessions. Lord, 5:20-24, 6:6-15, 7:50-56; Janevski, 11:4-11. For example, in my opinion, a POSITA would have understood the buddy system's acceptance or denial "would provide privacy for the existing user and would also permit the existing users to be able to censor the programs that they are watching." Lord, 6:27-32.

226. In my opinion, a POSITA would have reasonably expected success in combining the Janevski-Muchow-Kawamura system and Janevski-Boyle-Kawamura system with Lord because they use similar components in similar ways to achieve similar goals, such as PVRs, approving of a new participant PVR to join a synchronized viewing session, and remote controls. *See, e.g.*, Lord, 2:60-3:30; Janevski, 6:4-44. For example, Janevski, Kawamura, and Lord all use a "remote control" to control home entertainment systems. Lord, 3:25-30; Janevski, 6:40-44; Kawamura, [0088]-[0091]. Moreover, Janevski teaches "solicit[ing]" the "approv[al]" / "consent of the user of the current participant PVRs" "via" a "menu screen," similar to how Lord teaches "accepting or declining an offer" in "a message that appears on [the user's] screen." Lord, 5:20-25; Janevski, 11:4-11.

227. In my opinion, Janevski's PVR receiving the approval from the user's remote control (to the extent not expressly disclosed) would have used known features according to their known functions (Janevski and Kawamura's remote controls and Lord's user approval of an on-screen message), to achieve predictable results (Janevski's PVR receives control information from the user's remote control approving a third PVR to join the synchronized viewing session).

228. In my opinion, a POSITA would have reasonably expected success in combining Lord into a system including Muchow's/Boyle's management of Janevski's master-slave role failover because Muchow and Boyle modify unrelated elements of Janevski and Kawamura compared to Lord. Lord modifies commands received from Janevski's or Muchow's controller device, different than Muchow or Boyle. *Supra* Grounds 1/2, [1bi]-[1di]).

ii. [6b], [12b], [18b]: “in response to receiving the control information, the first zone player transmitting slave control information to the third zone player, wherein the slave control information enables the third zone player to join the synchrony group as a slave device of the synchrony group.”

229. In my opinion, Janevski discloses [6a], [12a], and [18a]. Janevski discloses that after “approv[al],” “[t]he initiator PVR 114 a, in response” (in response to the receiving the control information) “sends an originating synchronization message 402 to the new participant PVR 114 b” (transmitting slave control information). Janevski, 11:4-17.

230. Janevski explains that “[i]f the users of current participant PVRs 114a, b approve,” “the potential participant PVR 114b becomes a new participant PVR 114b, to be synchronized with the initiator PVR 114a.” *Id.* Thus, the subsequent actions allowing the “new participant PVR 114b” to join are taken in response to the requisite “approv[al].” *Id.*

231. Subsequent to the “approv[al],” “the new participant PVR 114b notifies the initiator PVR 114a that it is joining the current session.” *Id.* “The initiator PVR 114” (first zone player) “in response, sends an originating synchronization message 402” (transmits slave control information) “to the new participant PVR 114b” (third zone player). *Id.*

232. The “originating synchronization message” disclose slave control information because it enables the “new participant” (third zone player) to join the “synchronized viewing session” (synchrony group) as a “participant PVR 114b” (slave device) by instructing it to “advance[] [its] time count” to “be synchronized with the initiator PVR 114a” (master device). Janevski, 11:4-21.

XI. CONCLUSION

233. For the reasons set forth in Section X, it is my opinion that one skilled in the art would have found claims 1-3, 5-9, 11-15, and 17-18 of the '715 patent to be obvious.

234. In signing this declaration, I understand that the declaration will be filed as evidence in a contested case before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I acknowledge that I may be subject to cross-examination in this case and that cross-examination will take place within the United States. If cross-examination is required of me, I will appear for cross-examination within the United States during the time allotted for cross-examination.

235. I declare that all statements made herein of my knowledge are true, and that all statements made on information and belief are believed to be true, and that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Date: 11 October 2025

Respectfully submitted,



Dr. David Anderson