

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

LINKPLAY TECHNOLOGY INC.
Petitioner

v.

SONOS, INC.,
Patent Owner

IPR2025-00510
U.S. Patent No. 10,541,883

**DECLARATION OF DR. BRUCE HARTPENCE IN SUPPORT OF
PETITION FOR *INTER PARTES REVIEW* OF U.S. PATENT NO.
10,541,883**

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I, Bruce Hartpence, Ph.D., of Rochester, New York, declare that:

I. Introduction

1. My name is Bruce Hartpence, and I have been retained by counsel for Petitioner Linkplay Technology, Inc. (“Linkplay” or “Petitioner”) as an expert witness to provide assistance regarding U.S. Patent No. 10,541,883 (also referred to herein as “the ’883 Patent”). Specifically, I have been asked to consider the validity of claims 1-20 of the ’883 Patent (the “Challenged Claims”) in view of prior art, anticipation, and obviousness considerations, and understanding of a person of ordinary skill in the art (“POSITA”) at the time of the invention as it relates to the ’883 Patent. I have personal knowledge of the facts and opinions set forth in this declaration and believe them to be true. If called upon to do so, I would testify competently thereto.

2. I am being compensated for my time at my standard consulting rate. I am also being reimbursed for expenses that I incur during the course of this work. My compensation is not contingent upon the results of my study, the substance of my opinions, or the outcome of any proceeding involving the challenged claims. I have no financial interest in the outcome of this matter.

3. My analysis here is based on my years of education, research, and experience, as well as my investigation and study of relevant materials, including those cited herein.

4. I may rely upon these materials, my knowledge and experience, and/or additional materials to rebut arguments raised by the Patent Owner. Further, I may also consider additional documents and information in forming any necessary opinions, including documents that may not yet have been provided to me.

5. My analysis of the materials produced in this proceeding is ongoing, and I will continue to review any new material as it is provided. This declaration represents only those opinions I have formed to date. I reserve the right to revise, supplement, and/or amend my opinions stated herein based on new information and on my continuing analysis of the materials already provided.

II. Background and Qualifications

6. I summarize some of my relevant qualifications, work experience, and educational background below. A more detailed recitation of my qualifications and background is provided in my Curriculum Vitae, attached as Appendix A.

7. I earned my B.S. (1996) and M.S. (1998) degrees in Information Technology from the Rochester Institute of Technology. I then continued my formal education, earning a Ph.D. degree in Computing and Information Science from the Rochester Institute of Technology in 2020.

8. Following my Masters degree in 1998, I was an Assistant Professor at the Rochester Institute of Technology, where I taught Network Security Situation Assessment (NSSA) and Information Services & Technology. In 2007, I was

promoted to Associate Professor. I then earned a promotion to Professor in 2016, which is my current role.

9. In the decades I have spent teaching, I have taught many classes relevant to the subject matter of this case. For example, I have taught the following courses:

- Network Services
- Large Scale Networking
- Data Communication & Networks
- Internetworking
- Computer Concepts
- Introduction to Routing and Switching
- Networking for Developers
- Wireless Networking
- Network Fundamentals
- Design and Deployment of Wireless Networks
- Advanced Switching
- Computer Platform Fundamentals Lab
- Data Communications
- OS Scripting
- Wireless Concepts
- Sys Admin I
- Wireless Security
- Network Security Lab
- Advanced Switching
- Network Programming Lab
- Network Design and Performance
- Troubleshooting
- Intro to VoIP
- VoIP QoS and Security
- Wireless Networking
- Virtualization
- Voice over IP

- Advanced Routing and Switching
- Software Defined Networks Seminar
- Enterprise Computing
- Graduate Advanced Wired Networking
- Wireless Design
- Graduate Data Communication and Networks
- Graduate Introduction to Programming with Data
- Python for ML and AI

10. Over the course of the last three decades of scholarship, I have authored numerous publications relevant to the subject matter of this case. These include eleven books that I have written all of, or chapters of. They are:

- Hartpence, Bruce. Packet Guide to Routing and Switching. 1st ed. Sebastopol, CA: O'Reilly Media, 2011. Print;
- Hartpence, Bruce. Packet Guide to Core Network Protocols. 1st ed. Sebastopol, CA: O'Reilly Media, 2011. Print;
- Hartpence, Bruce. "Basic Device and Protocol Security." Network Security, Administration and Management. Ed. Dulal Kar and Mahbubur Syed. Hershey, PA: IGI Global, 2010. 1-19. Print;
- Hartpence, Bruce. The Packet Guide to Voice over IP Protocols. first ed. Sebastopol, Ca: O'Reilly, 2012. Print;
- Hartpence, Bruce. Packet Guide to Core Network Protocols. 1st ed. Sebastopol, CA: O'Reilly Media, 2011. Print;
- Hartpence, Bruce. "Internet Protocol Version 6." The Packet Guide to Core Network Protocols. Sebastopol, Ca: O'Reilly, 2012. 30. Print;
- Hartpence, Bruce. The Packet Guide to Voice over IP Protocols. first ed. Sebastopol, Ca: O'Reilly, 2012. Print;
- Hartpence, Bruce. "Transmission Control Protocol." The Packet Guide to Core Network Protocols. Sebastopol, Ca: O'Reilly, 2014. 200-230. Print;
- Hartpence, Bruce. "User Datagram Protocol." The Packet Guide to Core Network Protocols. Sebastopol, Ca: O'Reilly, 2014. 230-255. Print;
- Hartpence, Bruce. "Network Address Translation." The Packet Guide to Routing and Switching. Sebastopol, California: O'Reilly, 2016. 30.

Print; and

- Hartpence, Bruce. "Multicast." The Packet Guide to Routing and Switching. Sebastopol, California: O'Reilly, 2016. 35. Print.

11. These publications further include the following relevant scholarly articles. They are:

- Hartpence, Bruce, and Andres Kwasinski. CNN and MLP Neural Network Ensembles for Packet Classification and Adversary Defense. 2021 Intelligent and Converged Networks, IEEE, 2021.
- Hartpence, Bruce. Neural Network Architectures and Ensembles for Packet Classification: Addressing Visibility, Security and Quality of Service Challenges in Communication Networks. Rochester Institute of Technology, 2020.
- Hartpence, Bruce, and Andres Kwasinski. A Convolutional Neural Network Approach to Improving Network Visibility. 2020 29th Wireless and Optical Communications Conference (WOCC). IEEE, 2020.
- Hartpence, Bruce, Andres Kwasinski, "Combating TCP Port Scan Attacks Using Sequential Neural Networks", IEEE ICNC, 2020;
- Hartpence, Bruce, Kwasinski, A., "Fast Internet Packet and Flow Classification Based on Artificial Neural Networks", IEEE Southeastcon, 2019;
- Hartpence, Bruce, and Rossi Rosario. "Software Defined Networking for Systems and Network Administration Programs." The USENIX Journal of Education in System Administration (2016): 12;
- Hartpence, Bruce, "Performance Evaluation of Networks with Physical and Virtual Links", IEEE Global Information Infrastructure and Networking Symposium (GIIS), 2015;
- Hartpence, Bruce, Curricular and Performance Measurement Challenges in Cloud Environments, SIGITE 2014;
- Sharma et al., Performance of Meshed Tree Protocols for Loop Avoidance in Switched Networks, ICNS 2014;
- Sharma, K, et al, "Meshed Tree Protocol for Faster Convergence in Switched Networks", IARIA, 2014;
- Ghosh A., Hartpence B., Johnson D., Shenoy N., "A practical study of the problems of current Internet Routing Tables", SAM, 2013;

- Hartpence B, et al, “Global Crossing Whitepaper: Strengthening BGP and User Data Security Using Flow Analysis”, 2010;
- Hartpence, B., Troell, L., Simmons, S., “Study of the Performance of Safenet Ethernet Encryptors and a Comparison to IPSec Encryption Data”, Safenet and RIT whitepaper 2006;
- Bischof, H.P., Hartpence, B., Hui, F., Shenoy, N., “LAC Technical Report: A Robust Framework for Secure Connectivity and Roaming Over Serverless, Wireless Networks”, 2003; and
- A Networking and System Administration Laboratory Infrastructure To Support High Traffic Environments, CITC3, Leone, Weber, Hartpence, 2002.

12. In addition to organizing communication conferences at RIT from 2005-2007, my work has been highlighted at the following conferences:

- Wireless and Optical Communications Conference (WOCC), 2020;
- International Conference on Computing, Networking and Communication (ICNC), 2020;
- IEEE Big Data, 2019;
- IEEE Southeastcon, 2019;
- IEEE Global Information Infrastructure and Networking Symposium (GIIS), 2015;
- Global Environment for Network Innovation, 2014, 2015;
- Education and Information Systems, Technologies and Applications (EISTA), 2011, 2013;
- Security and Management Conference, 2010, 2013;
- Consortium for Computing Sciences in Colleges — Northeastern Region, 2007;
- Special Interest Group for Information Technology Education (SIGITE) Conference, 2005, 2007, 2009, 2014; and
- Computer Information Technology Conference (CITC3) Conference, 2002.

13. In addition to my scholarly publications, I have also produced over 400 videos on my YouTube channel teaching material relevant to the subject matter of

this case. These videos have totaled over half a million views. Some specific examples of relevant videos include:

- iperf Testing - How does it work with TCP and UDP?
- RFC 768 User Datagram Protocol
- The Packet Guide to VoIP Chapter 4 – RTP and RTCP
- Transmission Control Protocol (TCP) part 1
- Packet Guide to Voice over IP: Intro to VoIP Chapter 1 part 1
- RFC 791 Internet Protocol
- Packet Guide to VoIP Chapter 3 part 1 - Session Initiation Protocol (SIP)
- Packet Guide to VoIP Chapter 2 part 1 - Traditional Telephony
- SIP and H.323 VoIP Signaling Overview
- Domain Name System (DNS)

14. Prior to my time in this field, I served in the U.S. Navy for 6 years aboard the U.S.S. Enterprise (CVN-65). Following this experience, I then worked as an electrical technician for Mobil Chemical in Macedon, New York for four years.

III. Level of Ordinary Skill in the Art

15. In rendering the opinions set forth in this declaration, I was asked to consider the patent claims and the prior art through the eyes of a person of ordinary skill in the art (“POSITA”) at the time of the alleged invention. I understand the ’883 Patent was first filed March 11, 2019 but it also claims the benefit of priority to several earlier non-provisional applications and an earlier provisional application filed June 5, 2004. I also understand that Patent Owner has alleged that the invention was conceived even earlier, by March 11, 2004. I have used the Patent Owner’s claimed conception date of March 11, 2004 for my analysis related to a POSITA in

this declaration. I understand, however, the Patent Owner has to prove such date, which it has not in the proceeding.

16. I understand that the factors considered in determining the ordinary level of skill in a field of art include the level of education and experience of persons working in the field, the types of problems encountered in the field, the teachings of the prior art, and the sophistication of the technology at the time of the alleged invention. I understand that a POSITA is not a specific real individual, but rather is a hypothetical individual having the qualities reflected by the factors above. I understand that a POSITA would also have knowledge from the teachings of the prior art, including the art cited below.

17. Taking these factors into consideration, on or before the invention date of the '883 Patent, a POSITA of the '883 Patent would have had a Bachelor's degree in electrical engineering, computer engineering, computer science, information technology, or a related field, along with at least two years of experience in the design or development of connected consumer electronics, networked engineering, or the equivalent. Additional graduate education could substitute for professional experience, or significant experience in the field could substitute for formal education.

18. Before the invention date, my level of skill in the art was at least that of a POSITA. I also had extensive experience working with people having level of skill

of a POSITA at the time of the invention. I am qualified to provide opinions concerning what a POSITA would have known and understood at that time, and my analysis and conclusions herein are from the perspective of a POSITA as of the invention date.

IV. Materials Considered and Relied Upon

19. In reaching the conclusions described in this declaration, I have relied on the documents and materials cited herein as well as those identified in this Declaration, including but not limited to, the '883 Patent, the prosecution history of the '883 Patent, and prior art references cited herein. These materials include patents, related documents, and printed publications. Each of these materials is a type of document that experts in my field would have reasonably relied upon when forming their opinions.

20. In the cited references, all emphasis is added unless otherwise noted.

21. I have also relied on my education, training, research, knowledge, and personal and professional experience in the relevant technologies and systems that were already in use prior to, and within the timeframe of the assumed invention date of the claimed subject matter in the '883 Patent, which is alleged to be March 11, 2004.

- EX1001: U.S. Patent No. 10,541,883 in the name of Millington *et al.* (“the '883 Patent”)

- EX1002: Prosecution History of U.S. Patent No. 10,541,883
- EX1004: U.S. Patent Application Publication No. 2003/0212802 in the name of Rector *et al.* (“Rector”)
- EX1005: U.S. Patent Application Publication No. 2003/0083024 in the name of Richenstein *et al.* (“Richenstein”)
- EX1006: U.S. Patent Application Publication No. 2003/0092395 in the name of Gassho *et al.* (“Gassho”)
- EX1007: U.S. Patent Application Publication No. US2002/0174243 in the name of Spurgat *et al.* (“Spurgat”)
- EX1008: IEEE Std 802.15.1™-2002
- EX1009: Specification of the Bluetooth System: Covered Core Package version: 1.2 (“Bluetooth Standard”)
- EX1010: Infrared Data Association: Plug and Play Extensions to Link Management Protocol Version 1.1 (“IR Standard”)
- EX1011: IEEE 802.11 Standard 1999 (“802.11 Standard”)
- EX1012: ITC Claim Construction Order
- EX1013: Universal Serial Bus Specification 2.0 (2000)
- EX1014: Looking back at the ARPANET Effort (2003)
- EX1015: The “Only” Coke Machine on the Internet
- EX1016: Aspects of Data Acquisition System Design (1999)
- EX1017: IEEE 802.3 Standard (2002)
- EX1018: IEEE 802.11b Standard (1999)
- EX1019: A Technology Comparison, Memsen Corporation
- EX1020: Konica Minolta Feb. 2003 Press Release
- EX1021: Microtek Nov. 2002 Press Release

- EX1022: Sony Jul. 2000 Announcement
- EX1023: NEC Jan. 2003 Review
- EX1024: RFC1122
- EX1025: RFC1123
- EX1026: RFC793
- EX1027: RFC768
- EX1028: Functional Requirements 6.8, IEEE Project 802 (1997)
- EX1029: U.S. Patent No. 10,439,896
- EX1030: MOST Specification Rev. 2.0 (“MOST”)
- EX1031: IEEE - History of IEEE
- EX1032: IETF |Introduction
- EX1039: EpsonNet 802.11b User Guide (2002)

V. Legal Standards

22. I am not a lawyer and do not provide any legal opinions, but I have been advised that certain legal standards are to be applied by technical experts in forming opinions regarding the meaning and validity of patent claims. I have applied the legal standards described below, which were provided to me by counsel for the Petitioner.

23. It is my understanding that assessing the validity of a U.S. patent based on a prior art analysis requires two steps. First, one must construe the terms of the patent claims to understand what meaning a POSITA would have given the terms. Second, after the claim terms have been construed, one may then assess validity by

comparing a patent claim to the “prior art.” I understand that the teaching of the prior art is viewed through the eyes of a POSITA at the time the invention was made. My analysis as to what constitutes a POSITA is set forth above.

A. Legal Standard for Priority Date

24. I understand that the “priority date” or “effective filing date” of a patent is the date on which it is filed, or the date on which an earlier-filed U.S. or international patent application was filed if the patentee claims the benefit of priority to that earlier-filed U.S. or international patent application. I further understand that in order for the patent to be entitled to the priority date of the earlier filing, at least one claim in the application of the patent, upon filing, must be supported by the written description of the earlier-filed U.S. or international patent application.

B. Legal Standard for Anticipation

25. I have been informed that a patent claim may be “anticipated” if each element of that claim is present either explicitly or inherently in a single prior art reference, and that the elements should be arranged in the reference as in the claim. I understand that for a claimed limitation to be inherently present, the prior art need not expressly disclose the limitation, so long as the claimed limitation necessarily flows from the disclosure of the prior art. I understand there is no requirement that a person of ordinary skill in the art would have recognized the inherent disclosure at the relevant time, but only that the subject matter is in fact inherent in the prior art

reference. I also understand that in order for a prior art reference to anticipate a claim of a patent, the reference must enable one of ordinary skill in the art at the time of the filing to practice the claim without undue experimentation.

C. Legal Standard for Obviousness

26. I have been informed that a patent claim can be considered to have been obvious to a person of ordinary skill in the art at the time the application was filed. This means that, even if all of the requirements of a claim are not found in a single prior art reference, the claim is not patentable if the differences between the subject matter in the prior art and the subject matter in the claim would have been obvious to a person of ordinary skill in the art at the time the application was filed.

27. I have been informed that a determination of whether a claim would have been obvious should be based upon several factors, including, among others:

- the scope and content of the prior art;
- what differences, if any, existed between the claimed invention and the prior art; and
- the level of ordinary skill in the art at the time.

28. I have been informed that a single reference can render a patent claim obvious if any differences between that reference and the claims would have been obvious to a person of ordinary skill in the art. Alternatively, the teachings of two or more references may be combined in the same way as disclosed in the claims, if such

a combination would have been obvious to one having ordinary skill in the art. In determining whether a combination based on either a single reference or multiple references would have been obvious, it is appropriate to consider, among other factors:

- whether the teachings of the prior art references disclose known concepts combined in familiar ways, and when combined, would yield predictable results;
- whether a person of ordinary skill in the art could implement a predictable variation, and would see the benefit of doing so;
- whether the claimed elements represent one of a limited number of known design choices, and would have a reasonable expectation of success by those skilled in the art; whether a person of ordinary skill would have recognized a reason to combine known elements in the manner described in the claim;
- whether there is some teaching or suggestion in the prior art to make the modification or combination of elements claimed in the patent; and
- whether the innovation applies a known technique that had been used to improve a similar device or method in a similar way.

29. I understand that one of ordinary skill in the art has ordinary creativity and is not an automaton. I also understand that in considering obviousness, it is

important not to determine obviousness using the benefit of hindsight derived from the patent being considered.

30. I understand that various objective or “real world” factors may be indicative of non-obviousness. I understand that such factors are known as “secondary considerations” and they may include:

- the commercial success of the claimed invention;
- the existence of a long-felt, unresolved need for a solution to the problem solved by the claimed invention;
- failed attempts to solve the problem solved by the claimed invention;
- copying of the claimed invention;
- unexpected results of the claimed invention;
- praise for the claimed invention by others in the relevant field; and
- willingness of others to accept a license under the patent because of the merits of the claimed invention.

31. I understand that, for a secondary consideration to be relevant to the inquiry of obviousness, the evidence must demonstrate a nexus between that secondary consideration and the claimed invention. I understand that the nexus must be to some aspect of the claim not already in the prior art, and if the secondary consideration is actually directed to what was not known in the prior art, including patents and publications, there is no nexus.

VI. Technology Background

A. Introduction to Computer Networking

32. In order for two or more electronic devices to communicate with each other, share resources or data, or interact in any way there must be a connection between them. Any time that two or more electronic devices are connected for these purposes, it creates a computer network, i.e., a set of connections with a shared medium, interface, and communication format. There are countless different ways to build a network depending on its specific purpose, including different device components, different connection types or communication paths, and different network architectures or “topologies.” Each design choice made in building the network will come with different pros and cons, and accounting for these in the design is a critical role for one skilled in the art.

B. Networks

33. Networks are commonly described as either Wide Area Networks (“WANs”) or Local Area Networks (“LANs”) depending on their geographic coverage. While a WAN may extend to different parts of a single country or even the world, a LAN is isolated to a specific building or campus.¹

34. By at least the early 2000’s, both LANs and WANs could be built using

¹ EX1028 ([Functional Requirements Ver. 6.8](#)) at 2.

wired or wireless connections to transmit electrical, optical, or radio signals. For example, by the early 2000's there were multiple options for wired or "twisted pair" standards including IEEE 802.3 (known as "Ethernet"), Universal Serial Bus ("USB"), and Media-Oriented Systems Transport ("MOST").² Similarly, by the early 2000's IEEE³ had provided 802.11, which standardized both RF and IR transmissions as Wireless Local Area Networking ("WLAN"). RF transmissions for Personal Area Networks were also present in the form of "Bluetooth".⁴

35. Networks can be structured in a variety of different ways, but they can primarily be put into two categories: Ad-hoc and infrastructure. In an ad-hoc network, devices connect directly from one to another in a "peer-to-peer" or "point-to-point" structure, without any centralization or infrastructure required. As described by the IEEE, "A network typically created in a spontaneous manner. The principal characteristic of an ad hoc network is its limited temporal and spatial extent." (EX1008, pg. 5). Conversely, an infrastructure network is built around a central point for access, i.e., an "access point."

C. Device Discovery

36. Whether ad hoc or infrastructure, wireless connections are established

² EX1014 (Looking back at the ARPANET Effort (2003)); EX1017 (IEEE 802.3); EX1013 (USB Specification Rev. 2.0); EX1030 (MOST Specification Rev. 2.0.).

³ EX1031 (IEEE - History of IEEE).

⁴ EX1008 (IEEE Std 802.15.1™-2002).

at the link or physical connection layer by a “link controller” according to established message exchange protocols.

37. For example, when setting up a Bluetooth device, one device must be put into a mode where it sends out “pages” or “inquiries” as explained by IEEE, alerting the coverage area of their presence for a new connection:

inquiry: A message sent by a Bluetooth unit to discover the other Bluetooth units that are within the coverage area. The Bluetooth units that capture inquiry messages may send a response to the inquiring Bluetooth unit. The response contains information about the Bluetooth unit itself and its Bluetooth host.⁵

Page: A baseband substate where a device transmits page trains and processes any eventual responses to the page trains. Also, the transmission by a device of page trains containing the device access code of the device to which the physical link is requested.⁶

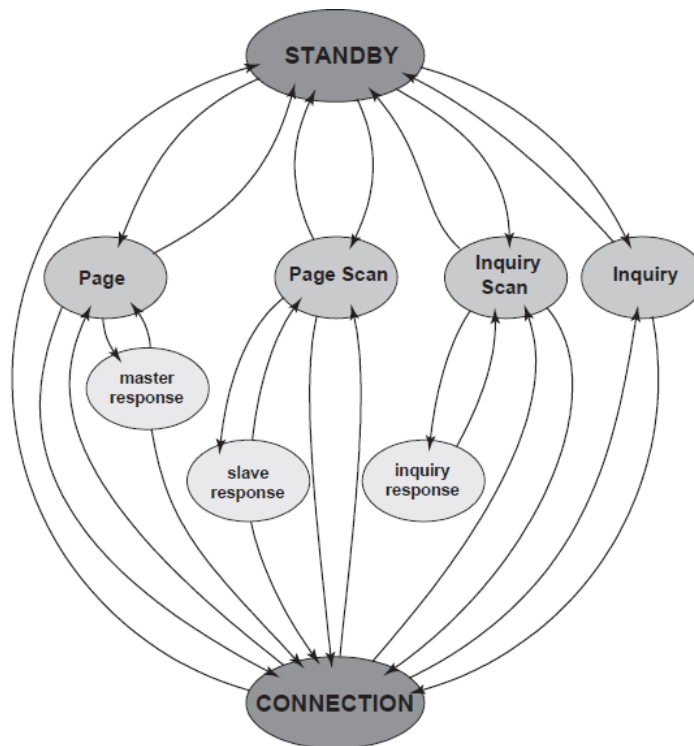
38. Under the Bluetooth standard, a Bluetooth device shall be in one, and only one, discoverability mode at a time. The “limited discoverable mode should be used by devices that need to be discoverable only for a limited period of time, during temporary conditions or for a specific event. The purpose is to respond to a device that makes a limited inquiry (inquiry using the LIAC).”⁷ “The general discoverable mode shall be used by devices that need to be discoverable continuously or for no specific condition. The purpose is to respond to a device that makes a general inquiry

⁵ EX1008, 27.

⁶ EX1008, 28.

⁷ EX1009, 1138.

(inquiry using the GIAC).⁸ When another device receives a page or an inquiry, it responds according to its current mode or “set of directives that define how a device responds to certain events.” If a device is set to “page scan” it will “listen for page trains.” In a similar manner, a device set to “inquiry scan” would receive and respond to an inquiry to establish a connection. The below diagram summarizes the mode states that transition a device from “standby” to establishing a connection.⁹



EX1008, FIG. 50

39. Similarly, since 1994, IrDA has explained that for devices using an

⁸ EX1009, 1139.

⁹ EX1008, 82-83.

infrared connection, they begin with “device discovery” whereby a device will identify itself to another in their standard protocols.

As part of the device discovery process, the device passes a DeviceInfo field to the host.[IrLAP] The link management layer controls the content of that DeviceInfo field in the IrLAP discovery process. The DeviceInfo field contains a service hint mask which has a single bit field defined that when set, states that the responding IrDA compliant device is Plug and Play ready.¹⁰

40. The IrDA standard explains that during discovery, the new device sends the host its “status” information identifying whether it is available for certain connections and services.¹¹ The host responds to the new device before completely establishing the IrDA connection.

D. Secure WLAN Configuration

41. On some networks, security takes on greater importance. On wired networks, the physical wire can provide a level of security on its own. But on wireless networks, such limitations do not exist. By at least 1999, IEEE standards included additional security configuration options in the form of an “authentication service” and encryption for networks using either of ESS and IBSS identification.

IEEE 802.11 provides the ability to control LAN access via the authentication service. This service is used by all stations to establish their identity to stations with which they will communicate. This is true for both ESS and IBSS networks. If a mutually acceptable level of authentication has not been

¹⁰ EX1010, pg. 5.

¹¹ EX1010, pg. 9 (“This is a bit field that is used by a device to convey status to the host at discovery time.”)

established between two stations, an association shall not be established.¹²

42. Such an authentication service can limit network access to devices configured with the correct “WEP encryption key.”

IEEE 802.11 also supports Shared Key authentication. Use of this authentication mechanism requires implementation of the wired equivalent privacy (WEP) option (see 8.2). In a Shared Key authentication system, identity is demonstrated by knowledge of a shared, secret, WEP encryption key.¹³

43. By incorporating such security measures, IEEE explains that wireless networks might attain the same level of security as a wired network, leading to the name “wired equivalent privacy” or “WEP”.

IEEE 802.11 specifies an optional privacy algorithm, WEP, that is designed to satisfy the goal of wired LAN “equivalent” privacy. The algorithm is not designed for ultimate security but rather to be “at least as secure as a wire.”¹⁴

E. Network Devices

44. Any device that can connect to another device can be a part of a network. Computers, phones, and satellites were among the first computer network devices, going as far back as the 1960’s with ARPANET.¹⁵ Even as early as the 1980’s, Carnegie Melon’s CS department had added networking capabilities to a refrigerator so the department could remotely check whether there was cold Coca Cola

¹² EX1011, pg. 36.

¹³ EX1011, pg. 36.

¹⁴ EX1011, pg. 37.

¹⁵ EX1014 ([“Looking back at the ARPANET effort, 34 years later”](#)).

available.¹⁶ And as of the early 2000's, that list had expanded to include a wide array of devices including printers¹⁷, scanners¹⁸, PDAs¹⁹, projectors²⁰, and even baby monitors²¹, to name a few.

45. Effectively networking of these varied devices requires organizing each group of devices into the right network architecture and using the correct network connections for the design. In order to standardize the way different devices are networked, reference models like the OSI model and the more operational TCP/IP model are a helpful tool to keep things straight.

1. The TCP-IP Model

46. The Transmission Control Protocol/Internet Protocol or "TCP-IP" model is defined by IETF's RFCs²² 1122 and 1123, each published in October of 1989. These RFCs define the requirements for an internet host, with RFC 1122 describing the "Communication Layers" or Levels 2-5 and RFC 1123 describing the application and support protocols.²³ RFC 1122 acknowledges the operation of the

¹⁶ EX1015 (cs.cmu.edu/~coke/history_long.txt).

¹⁷ EX1020 ([News release details-News Releases | KONICA MINOLTA](#)).

¹⁸ EX1021 ([Microtek ArtixScan 1800f with USB 2.0 announced | ePHOTOzine](#)).

¹⁹ EX1022 ([Sony unveils 'PalmPowered' entertainment PDA • The Register](#)).

²⁰ EX1023 ([NEC MT1065: Network- Ready Wireless Projector](#)).

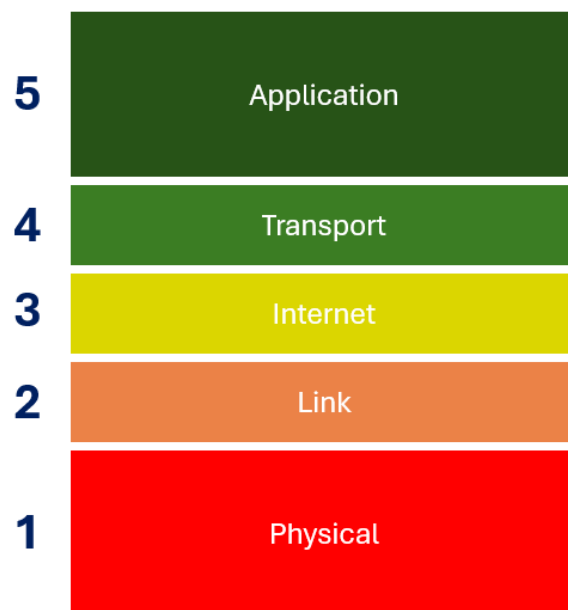
²¹ [Introduction to Industrial Networking](#), (available at <https://www.ccontrols.com/pdf/ExtV2N4.pdf>)

²² EX1032 (IETF |Introduction).

²³ EX1024 (RFC 1122) at 1; EX1025 (RFC 1123) at 1.

physical layer but the implementation details for both the link and physical layers are contained within the specific lower layer protocol (ex. 802.3 or 802.11).²⁴

47. The TCP-IP model separates network activity into the following five layers, as also shown below in my exemplary figure: Layer 1 (Physical), Layer 2 (Link), Layer 3 (Internet), Layer 4 (Transport), and Layer 5 (Application).



48. Layer 1, the Physical Layer contains the electrical and mechanical specifications.

49. As part of its responsibility to send and receive the transmission signals over the network, i.e., networking interfacing, the Physical Layer is also responsible for encoding and decoding the bits (as frames for example, for ethernet connections).

²⁴ EX1017 (IEEE 802.3 Standard); EX1018 (IEEE 802.11b Standard).

50. The next layer, Layer 2, is the “Link Layer,” which is responsible for translating the bits and frames from Layer 1 into “frames,” managing the access method, error control and Layer 2 addressing.

51. The next layer, Layer 3 is the “Internet Layer.” The Internet Layer is responsible for the construction of the IP packet. This includes the IP addressing, Layer 3 header checksum, quality of service bits and the encapsulation of the Layer 4 header and application data. Layer 3 is also responsible for routing of IP packets.

52. At Layer 4, the Transport Layer, TCP-IP ensures reliable data transmission across networks using transport protocols, including TCP and UDP, based on error prevention means including retransmissions, ack receipts, etc.²⁵

53. Finally, at the Application Layer, the TCP-IP model provides data translation and organization for application specific requirement and end-user activity.

VII. Overview of the '883 Patent

A. The '883 Patent

54. The '883 Patent is titled “Playback Device Connection.” The '883 Patent issued on January 21, 2020, from U.S. Patent Application No. 16/298,515, filed on March 11, 2019, and claiming to be a continuation of Application No.

²⁵ EX1026 (RFC 793 (TCP)); EX1027 (RFC 768 (UDP)).

15/091,113, filed on April 6, 2016, which claims to be a continuation of Application No. 14/486,667, filed on September 15, 2014, which claims to be a continuation of Application No. 13/618,829, filed on September 14, 2012, which claims to be a continuation of Application No. 11/147,116, filed on June 6, 2005, which claims priority to Provisional Application No. 60/577,283, filed on June 5, 2004.

55. The '883 patent recognizes “[c]onsumer electronic devices that operate using wireless or wired Ethernet standards are often subject to the same complicated set-up process as a wireless computer network.” EX1001, 1:36-39. The '883 patent purports to simplify this process by providing “techniques for automatically configuring necessary parameters of a device to be coupled to a network.” EX1001, 2:16-18.

56. In the '883 patent, the device to be connected (*i.e.*, referred to in the patent as the “second device”) is first activated by a user. EX1001, 2:38-39. This requirement exists to prevent “incident or unwanted configuration process ... initiated without the approval of the user.” EX1001, 2:40-41. The device then establishes “a rudimentary communication path” by exchanging messages with a “first device.” EX1001, 2:30-35. Specifically, the first device “broadcasts a message including probing datagrams in compliance with the standard IP broadcast” and the second device “responds to the message from the first device.” EX1001, 2:30-35.

57. The '883 patent stresses that this configuration process is applicable to

any type of “first device” and “second device.” EX1001, 5:35-5:40. The patent discloses that “one exemplary application of the present invention” is “for an audio system” where the “first device” can be a controller and the “second device” can be a zone player. EX1001, 2:45-3:10.

58. The '883 generally describes a process to set up a zone player on an Ad-Hoc WLAN so that it can directly communicate with other devices on the WLAN. Figure 3A provides an example and “shows three zone players and a controller that form an Ad-Hoc network.” EX1001, 4:49-52. As depicted below, Figure 3A “shows that there are three zone players 302, 304 and 306 and a controller 308 that form a network branch that is also referred to as an Ad-Hoc network 310.” EX1001, 9:1-3.

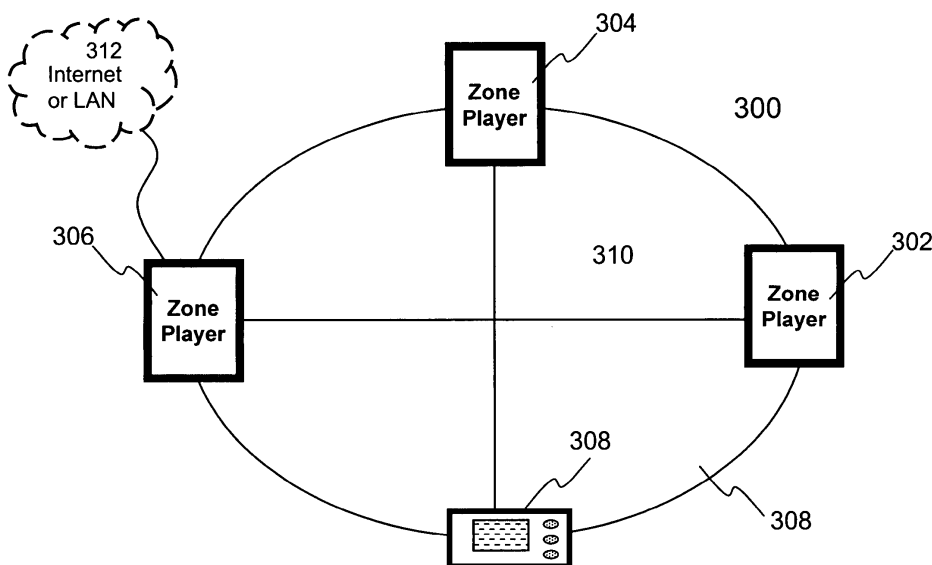


FIG. 3A

EX1001, Fig. 3A

59. The '883 patent refers to the controller 308 as a "Control Point (CP)" and describes as "control[ling] the overall network setup process and sequencing" and refers to the Zone Players as "ZP" and defines them as "any other device on the network that is placed to participate in the automatic configuration process." EX1001, 9:42-57

60. The patent refers to this network as "HOUSEHOLD," which HOUSEHOLD is described as "a local area network or other small network in which there is no one access point for all traffics" and thus devices on HOUSEHOLD "all communicate with each other in 'peer-to-peer' style." EX1001, 9:3-11. This is also referred to as an Ad-Hoc network, EX1001, 9:3-11, which is different from an Access Point (infrastructure) network. *See also* EX1001, 1:56-67 (distinguishing Ad-Hoc network from Access Point (infrastructure) network). The patent refers to the Household ID as "HHID," EX1001, 9:20-26, and provides that "the network 310 may be characterized by a unique HHID and a unique set of configuration variables or parameters, such as Channels (i.e., respective frequency bands), SSID (a sequence of alphanumeric characters as a name of a wireless network), and WEP keys (wired equivalent privacy, or simply security keys)." EX1001, 9:30-35.

61. The '883 patent discloses that the controller (CP) can facilitate a new zone player (ZP) to "execute a household join process to join the HOUSEHOLD," as shown in FIG. 3B below. EX1001, 16:31-34, Figs. 3B, 4A-4B. Specifically,

Figure 3B “shows an embodiment that involves a process of five exchanges of data” in that join process. EX1001, 4:53-54.

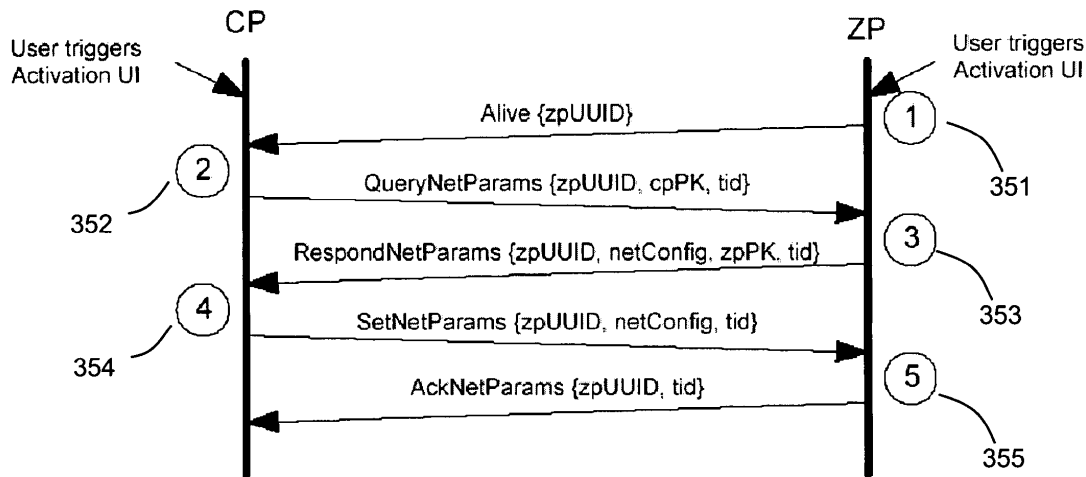


FIG. 3B

EX1001, Fig. 3B

62. As shown above, this exchange contains five different types of messages: “Alive, QueryNetParams, RespondNetParams, SetNetParams, and AckNetParams.” EX1001, 13:6-8. These messages are explained in the ’883 patent as follows:

63. Alive is “a message indicating that a named ZP is available for configuration” and includes “a globally unique identifier that identifies the ZP sending the message.” EX1001, 13:10-13.

64. QueryNetParams is “a request from the CP to the ZP to respond with the ZP’s current network configuration information” and “includes at least a

zpUUID, cpPK (the RSA public key of the CP) and tid (a unique transaction identifier).” EX1001, 13:14-18.

65. RespondNetParams is “a response to the QueryNetParams” and “includes the ZP’s network configuration information (HHID, WEP key, and RSA public key).” EX1001, 13:19-28. Here, the ZP’s “WEP key is encrypted using the CP’s public key that is only readable by the CP.” EX1001, 13:21-23.

66. SetNetParams is “a command message from the CP to the ZP indicating that the ZP should reconfigure its network parameters.” EX1001, 13:29-31. This message “includes at least a zpUU/O, netConfig, and tid.” EX1001, 13:32-35. Similar to what is described above, the “WEP key is encrypted using the ZP’s public key, and therefore only readable by the ZP.” EX1001, 13:31-32.

67. Finally, AckNetParams is “a response to the SetNetParams messaging” and “indicates ... that the network configuration contained [in SetNetParams] has been successfully applied.” EX1001, 13:38-42.

68. When “a user activates the configuration process (on both ZP and CP) at 351 in Fig. 3[B],” the ZP will be able to send an Alive message to the CP. EX1001, 13:43-53; *see also* EX1001, 16:31-34, Figs. 4A-4B.²⁶ After receiving the Alive

²⁶ The text of the patent itself refers to “FIG. 38” instead of Figure 3B. EX1001, 13:43-44. However, given that there is no Figure 38, that annotation 351 is found in Figure 3B, that the surrounding context of this passage also refers to Figure 3B, and

message, the CP will “send the QueryNetParams message.” EX1001, 13:56.

69. In response, the ZP will send either (1) an “empty HHID and WEP key” or (2) the ZP’s “current configuration” depending on whether the ZP is “unconfigured (e.g., factory default settings).” EX1001, 13:59-61. At that point, the CP will typically send a SetNetParams message so that “when the ZP receives a SetNetParams message, it reconfigures its own HHID and WEP key to match those contained in the network packet.” EX1001, 14:1-17.²⁷ Then “any devices that have been reconfigured will attempt to establish normal network communications using their new network configuration parameters.” EX1001, 14:31-35. As such, ZP joins the Ad-Hoc network (HOUSEHOLD) using the new network configuration parameters. EX1001, 14:31-35. Assuming this is successful, a ACKNetParams response will be sent which “indicates that the SetNetParams message was received and that network configuration contained therein has been successfully applied.” *See* EX1001, 13:38-41.

that “38” and “3B” look similar, a POSITA would understand the ’883 patent to be referring to Figure 3B, not Figure 38.

²⁷ There is one situation where instead of sending a SetNetParams, “[t]he CP sets its own config to match the ZP config, and the config process is terminated.” EX1001, 14:1-15. This situation occurs when the ZP has already been configured but the CP has not been configured. Although this table refers to “GP,” a POSITA would understand this to be a typographical error and that the inventors actually intended to refer to “CP.”

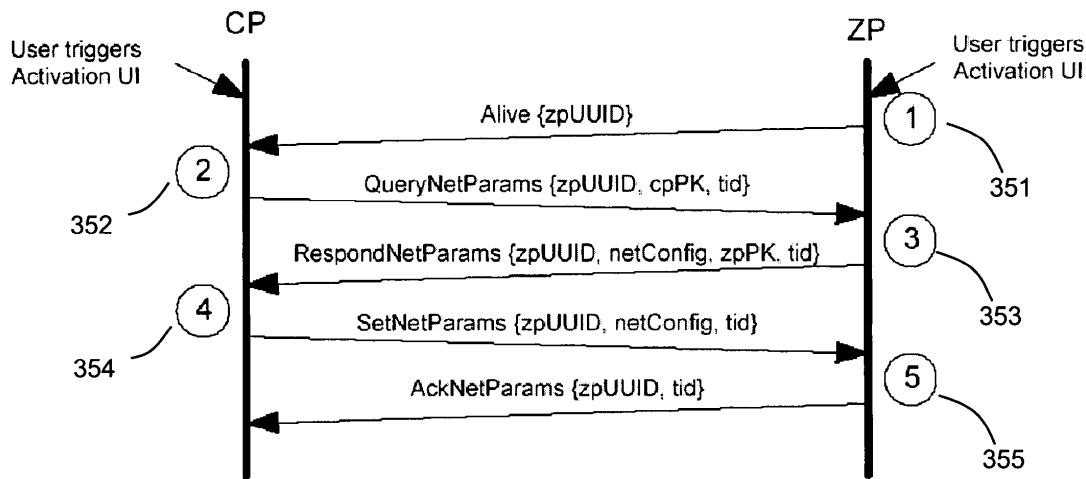


FIG. 3B

EX1001, Fig. 3B

70. Although the '883 patent mentions that there is another WLAN mode, called an “infrastructure” mode where the communication on the WLAN all goes through an access point, and discussed how Access Point (infrastructure) network is different from Ad-Hoc network (EX1001, 1:56-67), the specification does not disclose or otherwise describe the setup of the new zone player to connect to a wireless LAN defined by an access point. The '883 patent only mentions that, “[i]n one case,” the controller or the zone player can be an “access device” that “is coupled to an access point of a LAN” with wired interface 217 while communicating with the other zone players on the Ad-Hoc network wirelessly through wireless interface 216. EX1001, 6:53-7:2; *see also* EX1001, FIG. 3A (showing zone player 306 being coupled to Internet or LAN 312). This is a way how “these other zone players [on

the Ad-Hoc HOUSEHOLD] may . . . retrieve audio sources via the access zone player [from the LAN].” EX1001, 6:57-7:2.

B. File History of the ’883 Patent

71. I understand the ’883 patent was filed as a continuation patent application on March 11, 2019. The claims were initially rejected by the patent office for various reasons, including that claims 1, 2, 4-6, 12, 14-18 and 20 are anticipated by U.S. Patent App. Pub. No. 2004/0168081 (“Ladas”), and claims 3, 7-11, 13, and 19 are obvious over Ladas combined with additional art. EX1002, 189-209. In response, the patent owner amended the claims, and argued against the anticipation and obviousness rejections. EX1002, 166-170, 173-185. Amendments to claim 1 are shown below, which essentially narrowed the claim scope from setting up a playback device on a WLAN to setting it up on a WLAN “defined by an access point” and to require that the “the initial communication path with the computing device does not traverse the access point.” EX1002, 174-175.

1. (Currently Amended) A playback device comprising:
a network interface that is configured to provide an interconnection with at least one data network;
at least one processor;
a non-transitory computer-readable medium; and
program instructions stored on the non-transitory computer-readable medium that, when executed by the at least one processor, cause the playback device to perform functions comprising:

detecting a triggering event that causes the playback device to enter a setup mode in which the playback device transmits at least a first message indicating that the playback device is available for setup;

while in the setup mode, receiving a response to the first message that facilitates establishing an initial communication path with a computing device that is installed with an application for controlling the playback device, wherein the computing device is operating on a secure wireless local area network (WLAN) that is defined by an access point, wherein the initial communication path with the computing device does not traverse the access point ~~is outside of the secure WLAN~~;

receiving, from the computing device via the initial communication path, at least a second message containing network configuration parameters for the secure WLAN, wherein the network configuration parameters comprise an identifier of the secure WLAN and a security key for the secure WLAN;

using the network configuration parameters to connect to the secure WLAN that is defined by the access point; and

transitioning from communicating with the computing device via the initial communication path to communicating with the computing device via the secure WLAN that is defined by the access point.

72. Based on the amendments, the Applicant argued that Ladas uses the access point to provide network configuration parameters of the WLAN to a new device, but the amended claim 1 uses a “computing device,” different from the “access point” defining a WLAN, to provide network configuration parameters of the WLAN to a new device, via a path that “does not traverse the access point.” EX1002, 183-184. The claims were allowed as a result. EX1002, 110-117.

C. Interpretation of the '883 Patent Challenged Claims

73. I understand that in this proceeding, the claims should be construed in accordance with their ordinary and customary meaning in light of the specification, as understood by one of ordinary skill in the art. I have therefore applied those plain and ordinary meanings in my analysis.

74. I understand claim construction has not begun in the district court litigation involving both the Patent Owner and the Petitioner, and claim terms were not construed previously in the context of the '883 Patent. However, I understand that certain claim terms recited in the '883 Patent were previously construed by the

International Trade Commission (ITC) in the context of a patent claimed to share the same specification with the '883 Patent. These terms and their respective constructions, as determined by the ITC, are summarized below:

Terms	Constructions in a Related Patent in Previous Litigation
playback device	data network device configured to process and output audio
network interface	physical component of a device that provides an interconnection with a data network
wireless local area network	a wireless data communications network spanning a limited geographical area, such as an office, an entire building, or industrial park
security key	plain and ordinary meaning
at least a second message containing network configuration parameters, wherein the network configuration parameters comprise an identifier of the secure WLAN and a security key for the secure WLAN	at least one second message containing network configuration parameters, wherein the network configuration parameters comprise an identifier of the secure WLAN and a security key for the secure WLAN

75. I understand claim constructions have not begun in the pending litigation where Patent Owner asserted the '883 patent against the Petitioner, and that either party may not necessarily agree with the constructions above negotiated by Patent Owner and another party in other litigations. I understand the claim constructions eventually determined in the litigation involving Patent Owner and Petitioner may differ from the above or the plain and ordinary meaning.

76. In my analysis, I thus applied the plain and ordinary meanings, but to

the extent a related claim construction was made in the previous litigation, I have also considered and applied it alternatively where applicable, in forming my opinion with respect to each ground. To the extent that the litigation brought against the Petitioner adopt yet different claim constructions, I will supplement my opinions, if necessary.

VIII. Overview of the Cited References

77. General descriptions provided for the following references and combinations thereof are incorporated into each subsection and mapping of the claims that include citations to these references.

A. Rector (EX1004)

78. Rector provides systems and methods for providing “configuration and setup data” for new devices to join a network, EX1004, abstract, and is specifically focused on providing a convenient and secure method for doing so. Like the ’883 patent, Rector acknowledges that “[i]n order for devices to communicate on a wireless network, the devices must be configured with the correct communications parameters,” including SSID, communications channel, and encryption key. EX1004, [0005]; *see also* EX1001, 14:20-31.

79. However, Rector provides that “for many of the low-cost, special purpose devices such as the network audio device described above, the user interface is non-existent or difficult to use.” EX1004, [0005]; *see also* ’883 patent, 1:28-32,

1:46-49, 2:1-5 (“[f]or home entertainment products, there is a clear need to create simple methods for setting up and maintaining a secure wireless/wired in-home network with minimum human interaction”). In response to this, Rector notes that “some systems have provided a mechanism in which the required communications parameters are sent over the network from a previously configured device to the device to be added.” EX1004, [0005]; *see also* EX1001, EX1001, Fig. 3B.

80. However, in such systems “while the configuration parameters are being sent to the new device, encryption must be disabled so that the new device can receive the parameters correctly” which renders the network communications “vulnerable to being intercepted by outsiders.” EX1004, [0005]; *see also* EX1001, 14:52-15:30 (describing security features).

81. To solve this problem, Rector proposes essentially the same solution as the ’883 patent — establishing a connection between the new network device and a setup device (which is already connected to the network), and having those devices exchange the necessary configuration data for connecting to the network. EX1004, abstract, [0007].

82. Figure 2 of Rector “is a block diagram of a computer system ... that illustrates adding a new device to the network.” EX1004, [0011]. Specifically, Figure 2 describes the process of adding a network device 112 to the network 120. *See* EX1004, [0023]-[0024]. There is also a gateway component 106 which “sends

and receives data to and from devices on the local network 120.” EX1004, [0016] (gateway component 106 can be a “wireless access point” and “supports wireless network connections 120.2). The network device 112 can be “an audio device that receives data over a network and plays the audio data through loudspeakers.” EX1004, [0020].

83. To begin the setup process, the “network device 112 is brought within proximity boundary 130.” EX1004, [0023]. The “proximity setup component 108 detects the presence of network device 112” and “[u]pon detecting that network device 112 is in proximity, proximity setup component 108 establishes a network connection 202 with network device 112.” EX1004, [0023].

84. Rector is clear that its “invention is not limited to any particular type of connection. EX1004, [0023]. For example, Rector provides that this network connection 202 can be “a wireless connection” or a “wired connection.” EX1004, [0023]. It “is desirable for network connection 202 to be an infra-red wireless connection” but “the invention is not limited to any particular type of connection.” EX1004, [0023].

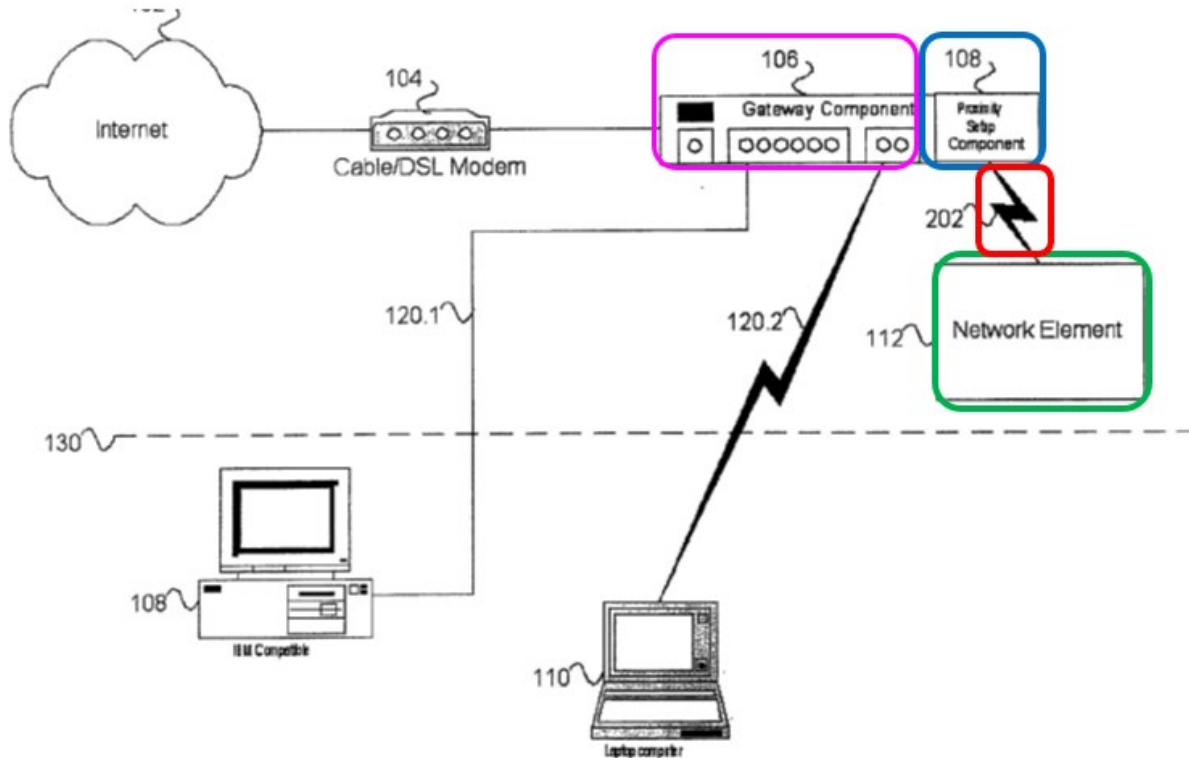
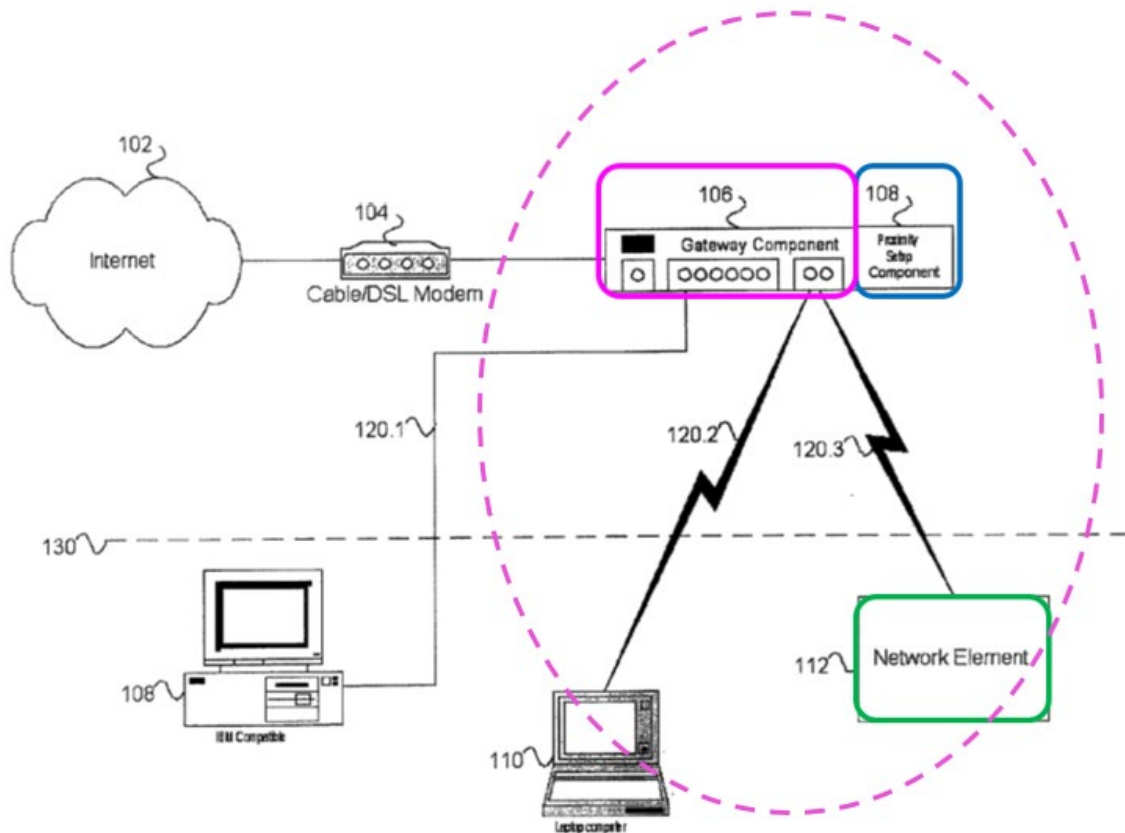


FIG. 2

EX1004, Fig. 2 (Annotated)

85. After the network connection 202 is established, “proximity setup component 108 can provide configuration and setup data to network element 112,” including “SSID, wireless channel, and encryption keys necessary to allow network device 112 to communicate on network 120.” EX1004, [0024]. At this point, the network device 112 “has the required information to establish a connection 120.3 with gateway component 106 allowing network device 112 to communicate with any device on network 120.” EX1004, [0025]. For example, this allows the network device 112 to be “moved beyond proximity boundary 130” and be so that it will

disconnect from connection 202, yet remain in contact with the devices on network 120. *See* EX1004, [0025]. This is shown in Figure 3, which “illustrates the system after the new device has been added.” EX1004, [0012].



EX1004, Fig. 3 (Annotated)

B. Richenstein (EX1005)

86. Like the '883 Patent, Richenstein provides devices, methods, and systems for playing synchronized audio on a network of audio devices. (EX1005, Abstract.) Richenstein explains that its invention allows multiple sources of audio to be shared by multiple listeners:

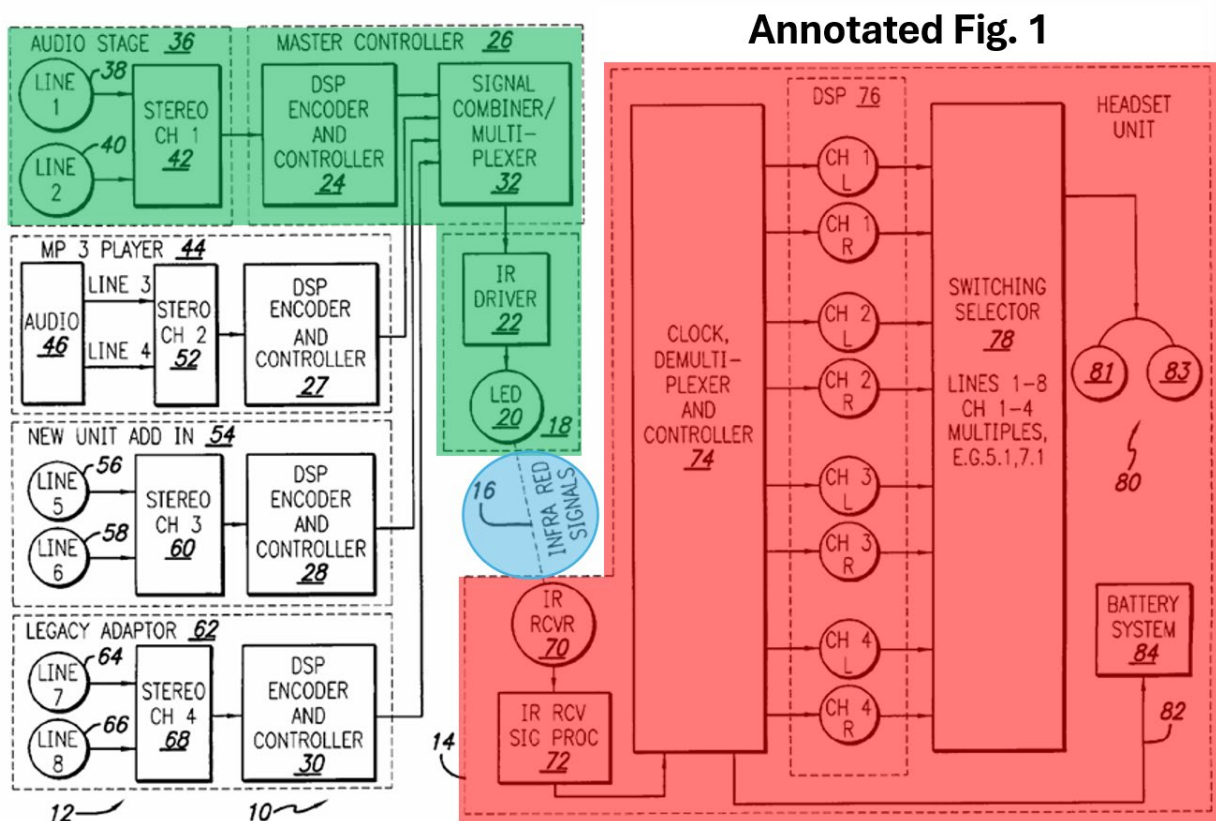
This invention relates to wireless communication systems, and more particularly to wireless audio and video systems for providing a plurality of selectable audio-video signals from one or more sources to one or more listeners in an automobile, airplane, or building.²⁸

87. To achieve this, Richenstein discloses a playback system, method, and devices for distributing audio data and control information using networked audio devices, including transmitters, receivers, and “two-way” or *bidirectional* wireless devices. (EX1005, [0007], [0033], [0040]-[0041], [0044], [0049], [0052]-[0056], [0057]-[0058], [0064]-[0069], [0081]-[0082], [0087]-[0088], [0091]-[0094], [0102]-[0105], [0108], [0112]-[0113], [0118]-[0119], [0122], [0124], [0127], [0130]-[0134], [0140]-[0144], [0153]-[0154], & Fig. 1 (transmitters and receivers); [0050], [0034]-[0036], [0051], [0146]-[0149], [0155]-[0156], Figs. 2, 5, 7, & 10 (transmitters); [0039], [0042], [0047]-[0048], [0056], [0062]-[0063], and Figs. 4, 5, & 14-18 (receivers); [0159], [0161], [0165], [0166], [0168], [0175], and Figs. 19-23 (bidirectional devices).)

88. With reference to Fig. 1, Richenstein’s system discloses a network of playback devices that can share audio data and playback audio data in synchrony. These playback devices are connected on a local network (system 10) defined by wireless signals 16. (e.g., EX1005, [0033]-[0036]). According to Richenstein, a playback device (exemplary audio device 34) can be connected with various audio

²⁸ EX1005, [0002].

sources, and it can transmit digital audio streams to the other playback devices (exemplary headset 14). (EX1005, [0036]-[0041]). As Richenstein explains, audio device 34 includes digital signal processing components to create the digital audio stream (master controller 26 with DSP encoder 24) and a transmitter 18 to transmit the stream as signals 16 to the network (network 10). (EX1005, [0033]-[0036]).



EX1005, FIG. 1 (Annotated)

89. Richenstein describes that audio device 34 can be either an audio playback device itself or included as a component of other playback devices:

Audio device 34 thereby represents any audio, video or data source including mono and stereo radios, CD and cassette players, mini-disc

players, as well as the audio portions of electronic devices that provide other types of signals such as computers, television sets, DVD players and the like.²⁹

90. Richenstein explains that listeners can remotely control playback devices, such as audio device 34, using other devices on the network. For example, Richenstein describes that audio device 34 can be remotely controlled using remote controller 936 equipped with keypads, joysticks, push buttons, toggle switches, and voice commands.

With continued reference to FIG. 21, remote controller **936** includes IR receiver/transmitter **984** for two-way communication with audio device **34** via IR receiver/transmitter **806** and, optionally, a repeater included in IR receiver/transmitter **926**. Remote controller **936** may provide any one or more of a plurality of controls, including but not limited to key pads, joysticks, push buttons, toggles switches, and voice command controls, and may further provide sensory feedback such as audio or tactile/vibrations.³⁰

91. Richenstein further explains that when connected to audio device 34, remote controller 936 may be used to control and access various audio sources connected to audio device 34, including cellular telephone 805, DVD player 803, and video game console 837.

Remote controller **936** may be used for a variety of purposes, including accessing and controlling cellular telephone **805** as previously described. Remote controller **936** may also be used to access and control video game player **922** to play a video game displayed on video display(s) **838**, with the game audio track played through headphones

²⁹ EX1005, [0036].

³⁰ EX1005, [0166], [0152].

80, 980. Remote controller **936** may further be used to control video display **838** and adjust display functions and controls, to control DVD player **803** to display a movie on video display **838** and control its functions (e.g. pause, stop, fast forward), to control trunk-mounted CD changer **950**, to request telemetry data from vehicle CPU **924** to display on video display **838**, or to control other vehicle **900** functions such as locking/unlocking doors and opening/closing windows. Two or more remote controllers **936** may be provided in vehicle **900** to allow two or more users **933, 935** to play a video game, displayed individually on multiple, respective video displays **838**.³¹

92. As shown in annotated Fig. 1, Richenstein discloses the transmitting playback device (e.g., audio device 34) can transmit audio bitstream signals 16 over the network to the receiving playback device (e.g., head unit 14) for the two devices to playback the audio data synchronous. Richenstein also explains that its playback devices each include a clock. This is true for devices on each side of the transmission (transmitting and receiving). As shown in Fig. 1, playback device 14 receiving audio includes a Decoder 74 with clock, multiplexer, and controller. Additionally, Richenstein shows that playback devices connected to various audio sources and with an IR module for transmission include clocks and clock phasing component 628 (shown in green) in Figs. 7 and 8. In Fig. 8, Richenstein further shows the playback device includes both its own base crystal (665) and a master clock 660.

³¹ EX1005, [0166], [0146], [0152].

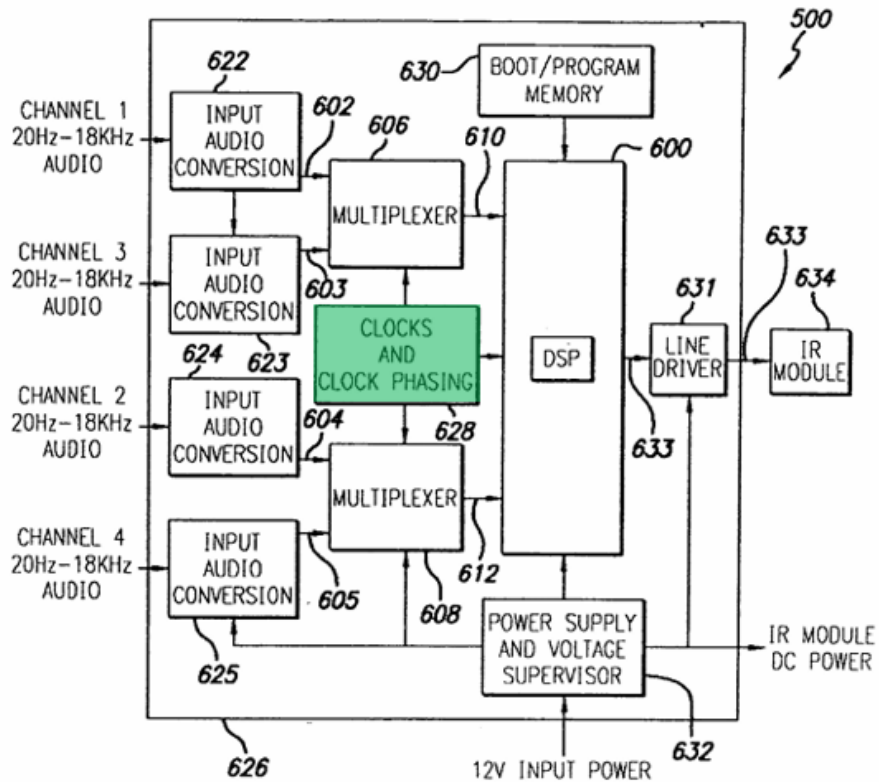


FIG. 7

EX1005, FIG. 7 (Annotated)

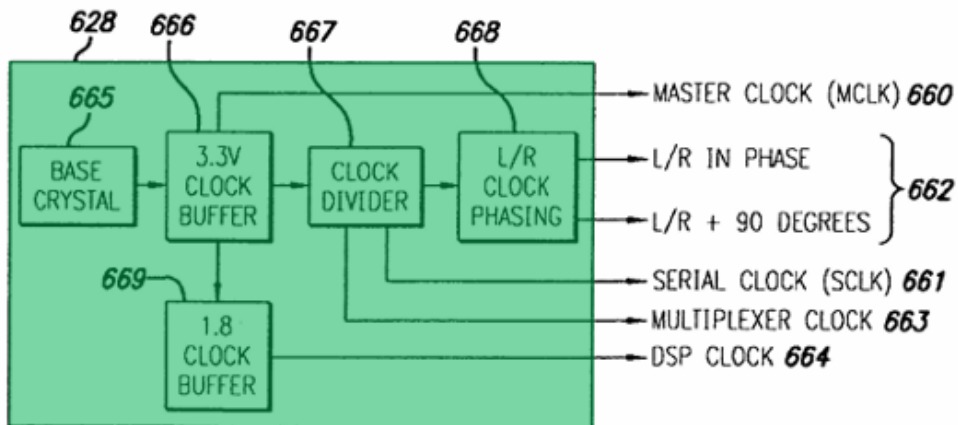
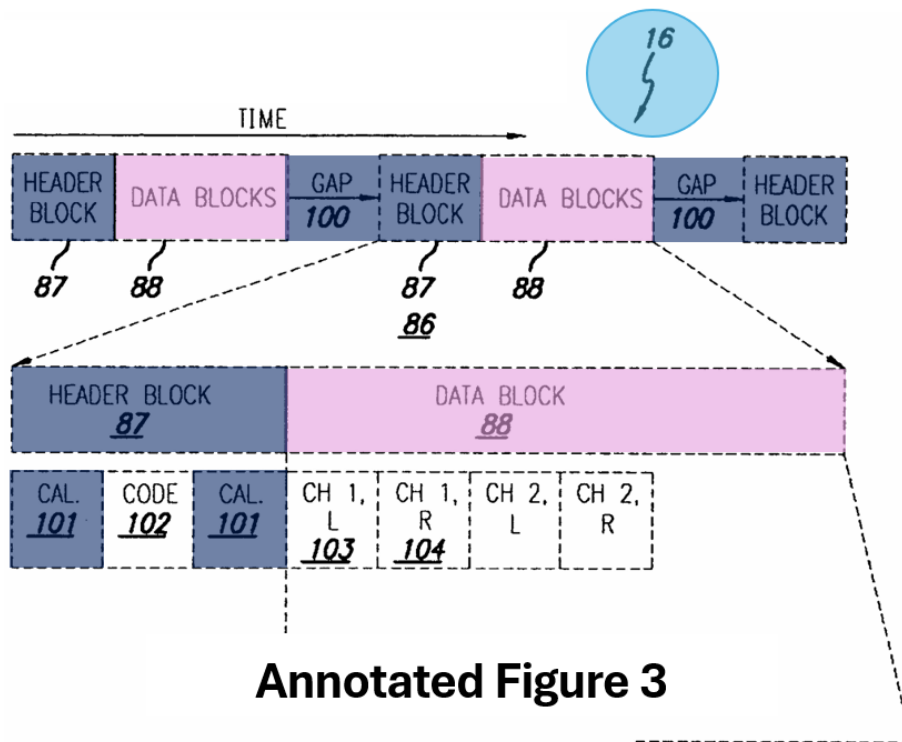


FIG. 8

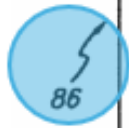
EX1005, FIG. 8 (Annotated)

93. For these independently clocked devices to playback audio content in synchrony, Richenstein uses the audio bitstream signals 16 to communicate the audio data and synchronization control information along with the audio data so that the receiving playback device can playback the audio data at the proper timing in synchrony with the transmitting playback device. Specifically, Richenstein provides two preferred embodiments for the audio bitstream signals 16 in Figs. 3 and 12, where the bitstream contains the encoded audio data, calibration data, and code or “control” data. (EX1005, [0033]). As Richenstein further provides, with reference to Figure 3, calibration data would include “timing data, signal magnitude data, volume and/or frequency data as well as control data related, for example, to audio format or other acoustic information.” (EX1005, [0057]). Referring to Figs. 3 and 12 (both showing embodiments of signals 16), Richenstein explains that synchronizing the playback between transmitting and receiving playback devices can be achieved in multiple different ways, providing examples using header blocks 87, gap fields 100 and 90, and calibration fields 101. (EX1005, [0066]-[0069], [0101]-[0102]).



Annotated Figure 3

EX1005, FIG. 3 (Annotated)



Annotated Fig. 12

EX1005, FIG. 12 (Annotated)

94. Richenstein further explains that using “two-way” or bidirectional audio devices where each device can both transmit and receive signals allows complex networks. (EX1005, [0161].) As summarized in further detail the exemplary embodiments below, Richenstein describes such systems as bidirectional audio networks for vehicles including automobiles, buses, train cars, naval vessels, airplanes, etc. (in connection with Figures 19-22), as well as bidirectional audio networks in buildings (in connection with Figures 23), which describe. (EX1005, Figs. 19-23.)

95. In the exemplary embodiment of Fig. 20, Richenstein provides multiple playback devices connected over a vehicle local network, including an in-dashboard audio device 34, which may be hardwired or otherwise connected to various audio source devices including cellular telephone 805, DVD player 803, and video game console 837. (EX1005, [0146], [0152]). Using this exemplary embodiment, Richenstein details how flexibly control data may be used to control different devices in a bidirectional system. As a first example, Richenstein explains that due to the bidirectional nature of the network, multiple networked devices in the embodiment of Fig. 20 may communicate with the cellular telephone 805 or other similar device through audio device 34:

Vehicle 800 may also include cellular telephone or other wireless communication device 805 that may be connected to audio device 34, which again can encode a voice stream from the telephone for IR

transmission. As described below, equipment may be provided for two-way communication by passengers to converse on the telephone via audio device 34 and other IR devices according to the invention.³²

96. Richenstein explains that due to the bidirectional nature of the embodiment, multiple devices in the vehicle can control the audio source devices through audio device 34. First, Richenstein provides an example of headphones 80 and microphone 832 controlling the cellular phone:

Headphones 80, or microphone 83[2], may incorporate certain controls to access features of the cellular telephone or other communication device, such as hang-up, dial, volume control, and communication channel selection.³³

Second, Richenstein describes how game control devices 836 can issue commands to game console 837 via audio device 34:

Optionally, game control device 836 may also be connected to module 822 for communicating with video gaming console 837 connected to audio device 34. In this embodiment, passengers may wear headphones 80 to listen to the soundtrack of a game software executed by video gaming console 837 to generate audio and video signals for transmission by audio device 34. The video signals may be displayed to the passengers on display device 838, and the passengers may interact with the game software being executed on the gaming console via inputs through game control device (e.g. a joystick, touch pad, mouse, etc.) 836.³⁴

In yet another example, Richenstein describes how game control devices 836 (shown

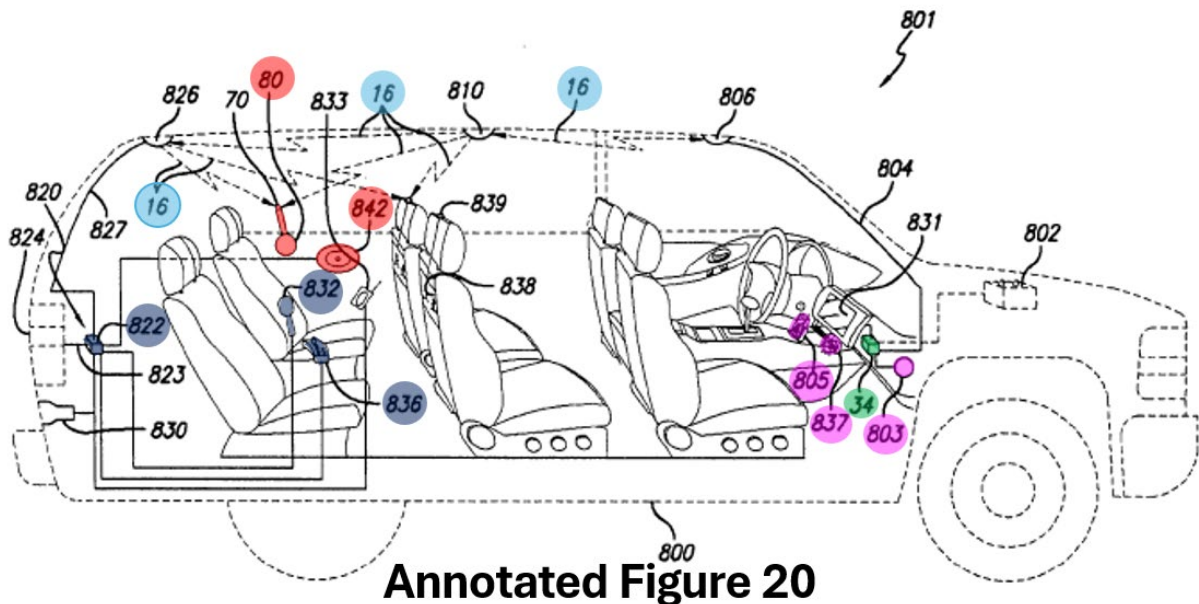
³² EX1005, [0146].

³³ EX1005, [0149].

³⁴ EX1005, [0152].

in dark blue), audio device 34 (shown in green), or *any other input device*, could be used to select the audio channel for speaker 842 (shown in red) using control information in the header of a packet:

The channel played through speaker 842 may be selected through audio device 34 (i.e. by the driver of vehicle 800) or any other input device including game control device 836 (i.e. by a passenger in the vehicle), and the channel thus selected may be indicated in the header of each packet transmitted from the audio device for decoding by a DSP within module 822.³⁵



EX1005, FIG. 20 (Annotated)

97. Richenstein provides further examples of flexible control throughout the additional embodiments. For example, in Fig. 21's additional vehicle embodiment, Richenstein describes how that bidirectional module 923, which is

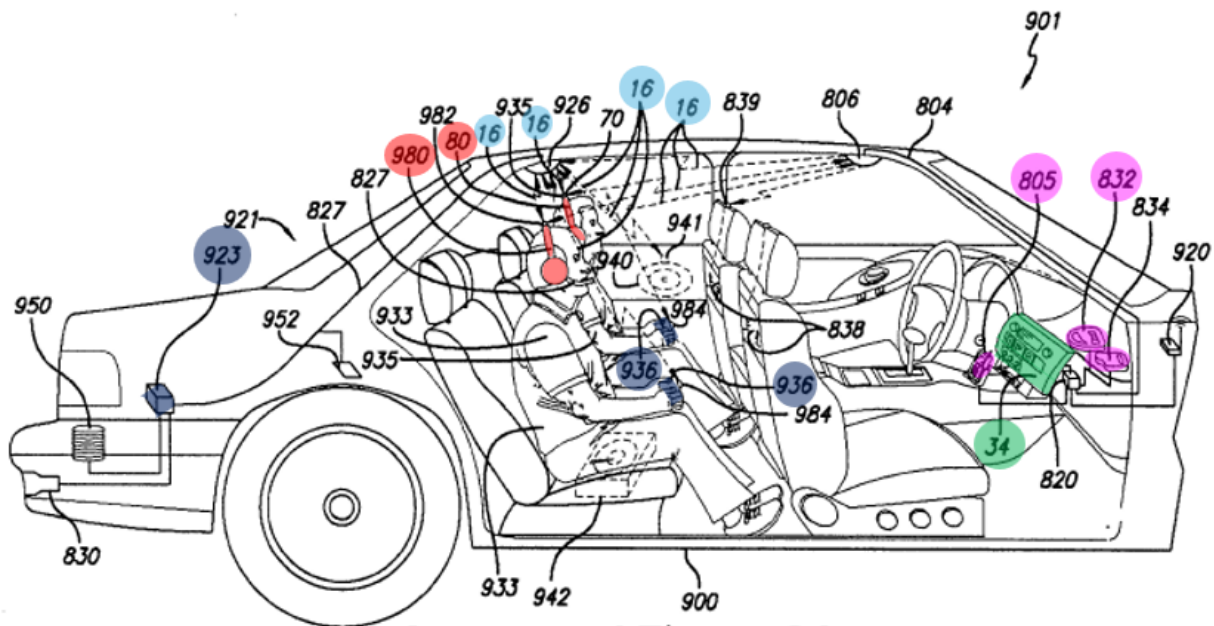
³⁵ EX1005, [0153].

connected to a CD player/changer in the rear of a vehicle, and may both transmit CD audio and receive commands from audio device 34 (shown in green) to switch CDs or to select, shuffle, or repeat tracks:

Module 923 may also receive audio data from audio device 34 and provide the audio data to subwoofer 942 that may be installed in the trunk or, as shown, underneath the rear seat of vehicle 900. Additionally, module 923 may also be hardwired to trunk-mounted CD changer 950 and accept audio data from the CD changer to transmit to audio device 34 for playback within vehicle 900, as well as receive control commands input by the vehicle driver through audio device 34 to control the CD changer, such as CD and track selection, shuffle, repeat, etc.³⁶

Similar to Fig. 20, Richenstein explains that Fig. 21's headphones 980 (shown in red) may control the cellular phone 805 through audio device 34, using a headphone dialing pad or voice controls to initiate a call. (EX1005, [0166]). Richenstein even provides that remote controllers 936 (shown in dark blue) may be used to control a variety of devices via audio device 34 including cellular telephone 805, game console 922 (game play), DVD player (play, pause, stop, fast forward a movie), CD changer 950, headsets 980 and 80, and even vehicle functions like locking and unlocking doors or opening and closing windows. (EX1005, [0166]).

³⁶ EX1005, [0162].

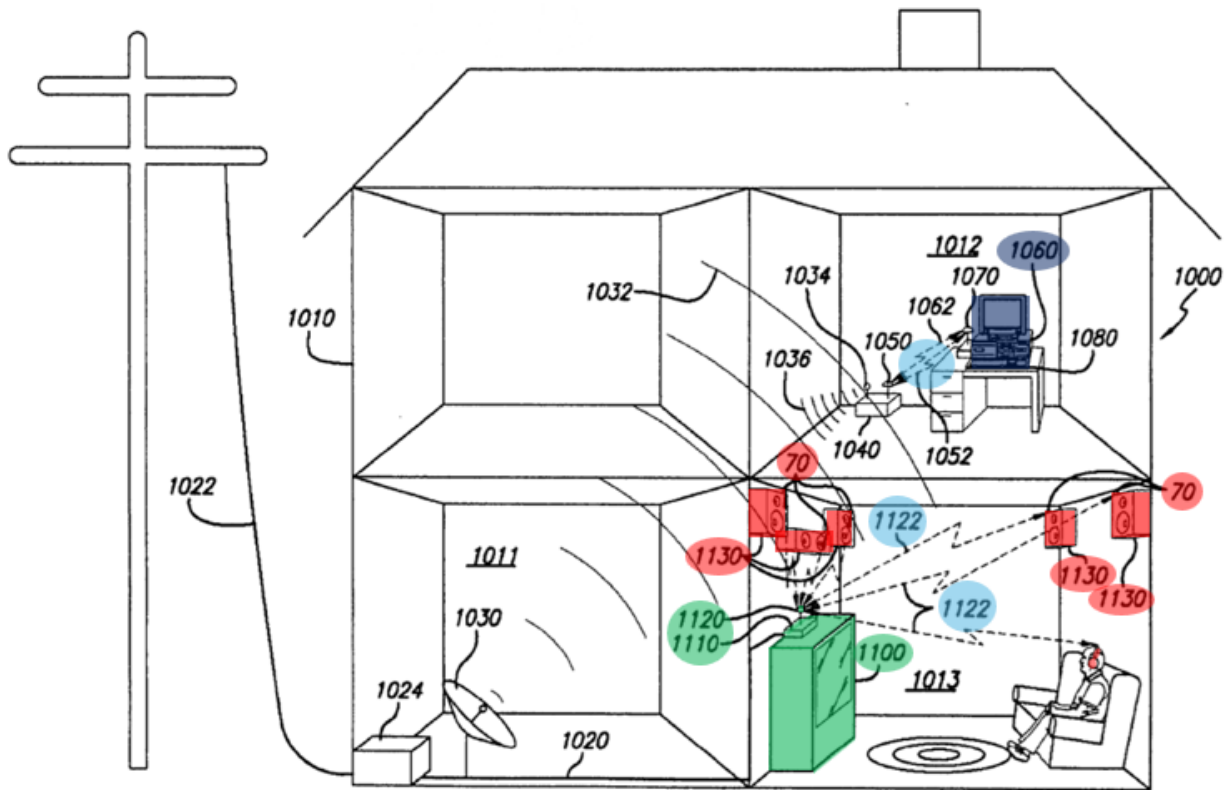


EX1005, FIG. 21 (Annotated)

98. With reference to Fig. 22, Richenstein further explains that while transmitting devices, receiving devices, and bidirectional devices use exemplary IR modules for signals 16, devices may be networked using other means including the exemplary data bus 990 according to well-known standards including Bluetooth wireless communications or Media Oriented Systems Transport (MOST). (EX1005, [0171].) Richenstein provides that using the data bus or similar networks, audio device 34 is not required to be a central control unit, and such responsibilities may be distributed throughout the network, including to exemplary vehicle CPU 924. (EX1005, [0173]). Richenstein explains that by using proper headings and addresses to identify individual devices within the network, the network may be used to

provide individual channels and commands throughout the network as long as the devices share a compatible coding scheme. (EX1005, [0173]).

99. In Fig. 23, Richenstein provides additional examples and details building on the embodiments described in Figures 1-22. For example, in Figure 23, Richenstein explains how the capabilities described can be applied to a home or building environment, where the devices may be connected to a LAN. (EX1005, [0174]). Richenstein shows a LAN network with room 1013, where home theatre system 1100 (shown in green) includes digital signal processing 1110 and transmitter 1120 (as Fig. 1's audio device 34 includes DSP 24 and transmitter 18) and wireless speakers 1130 (shown in red, including the same receiver unit 70 as Fig. 1's headset). (EX1005, [0176]). Richenstein further provides room 1012, where CPU 1060 includes encoder/decoder 1080 for two-way communication for communication with various devices including "televisions, radios, video game consoles, personal digital assistants, various household appliances equipped for remote control, and home security systems." (EX1005, [0176]).



Annotated Figure 23

EX1005, FIG. 23 (Annotated)

100. Richenstein explains that audio devices may be configured remotely using another device to provide the required settings.

Alternatively, custom features may be adjusted via audio device **34** so that even one-way headphones **80** may enjoy customized settings. In embodiments wherein customized features are stored in memory by audio device **34**, each individual set of headphones **80** and/or **980** may be provided with a means of individual identification, which may be entered by a user via the controls provided on the headphones (e.g. define the headphones as number one, two, three, etc.).³⁷

101. Richenstein further explains that in order to uniquely identify each

³⁷ EX1005, [0169].

device, a user may provide unique identifiers for each exemplary audio device 34.

DSP 76 of headphones 80 may be programmed to identify different audio devices 34, such as may be found in a vehicle and in a home. Each audio device 34 may thus include further information in the header of each data packet to provide a unique identifier.³⁸

C. Gassho (EX1006)

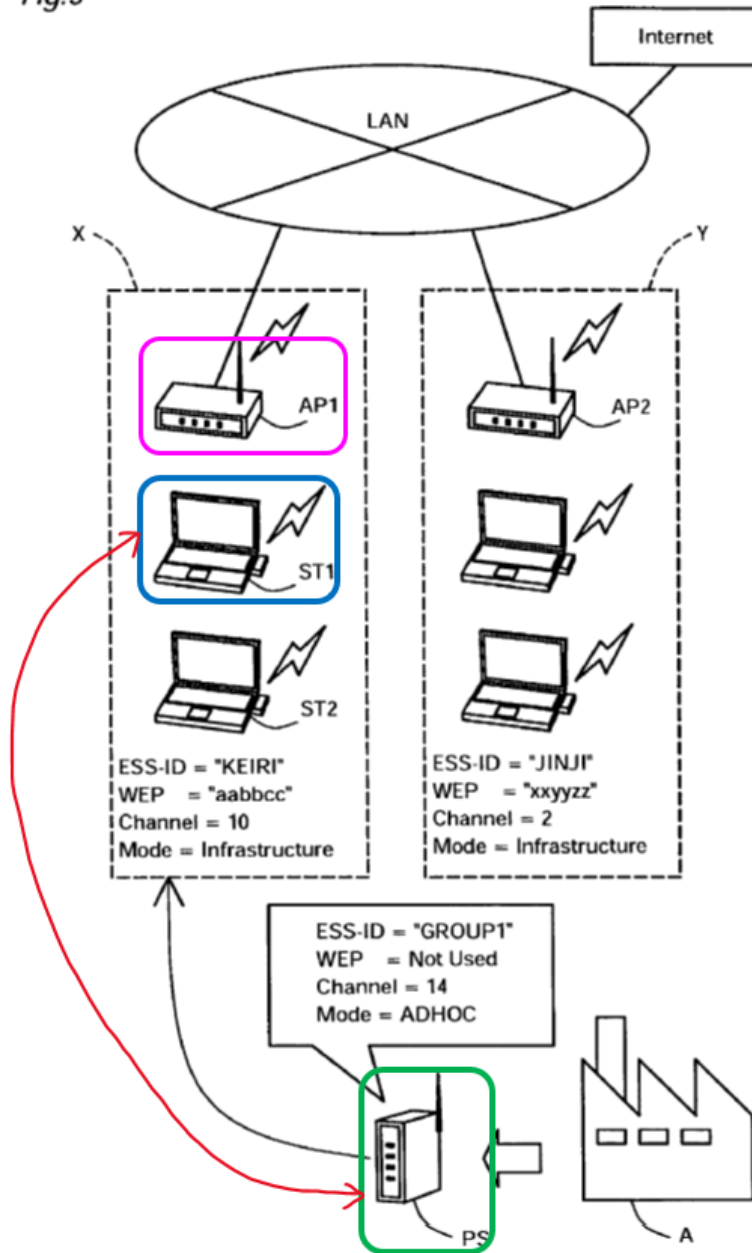
102. Gassho describes using a wireless communication device on a wireless network to securely set up another wireless communication device to connect to that wireless network. EX1006, abstract, [0002]. Similar to the '883 patent and Rector, Gassho also recognized that “[i]n the wireless LAN, setting information in each wireless communication device is required for establishment of communication,” such as ESS-ID, channel, and WEP key, and this setup process may be difficult for the user, especially for devices that have no “interface to implement the settings.” EX1006, [0004]-[0005]. Like Rector, Gassho also provided a nearly identical solution as claimed in the '883 patent — establishing a short distance connection between a device already on the WLAN and the new wireless network device for the device to transmit the network setting parameters of the WLAN to the new device. EX1006, abstract, [0008]-[0011].

103. Gassho provides two embodiments: first embodiment utilizing a station ST to carry out the settings in another wireless communication device, and second

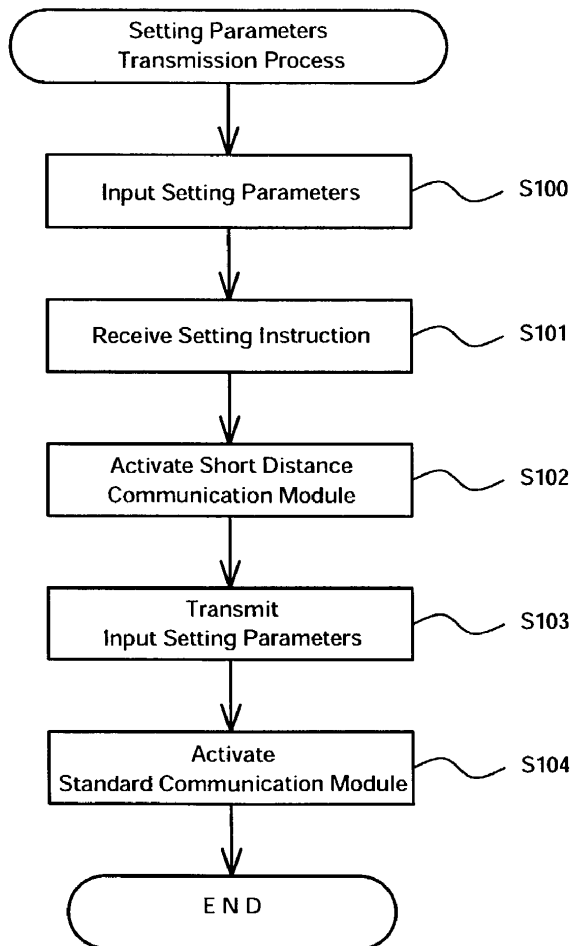
³⁸ EX1005, [0169].

embodiment an access point to carry out the same settings. EX1006, [0061]. For example, annotated FIG. 3 of Gassho below shows the first embodiment, where a wireless communication device (in green box), such as a print server (PS), is to be added to an infrastructure WLAN network group X that is defined by an access point AP1 (in pink box). EX1006, [0045], [0054], FIGs. 3-4. A station ST1 connected to AP1 is used as a wireless equipment setting device to transmit the network setting parameters of network group X to PS. EX1006, [0048]-[0052], [0055]. To do that, ST1 and PS are first set to the same channel to enable “a direct communication” (redline) between them and then ST1 activates a short distance communication to securely transmit the setting parameters, including ESS-ID and WEP, to radio print server PS over the direct connection. EX1006, [0054]-[0055], FIG. 3 (step S, FIG. 4 (S100-S103)). In the second embodiment, Gassho discloses the short distance communication can also be established in response to a signal from the other device requesting the setting parameters. EX1006, [0065], FIG. 6 (steps S200-S201). After PS confirms that the setting parameters are received, ST1 stops the short distance communication with PS and activates a “standard communication” to transmit other data such as print data. EX1006, [0009], [0017], [0042], [0054], [0056].

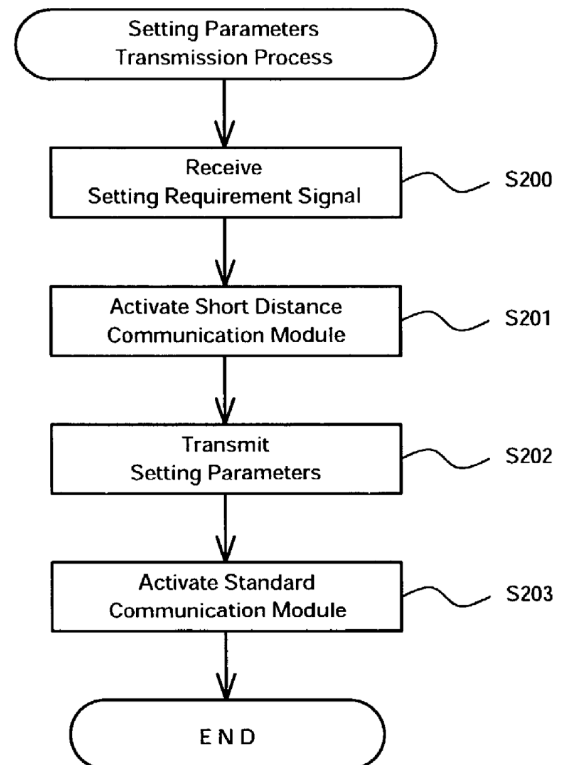
Fig.3



EX1006, FIG. 3 (Annotated)



EX1006, FIG. 4



EX1006, FIG. 6

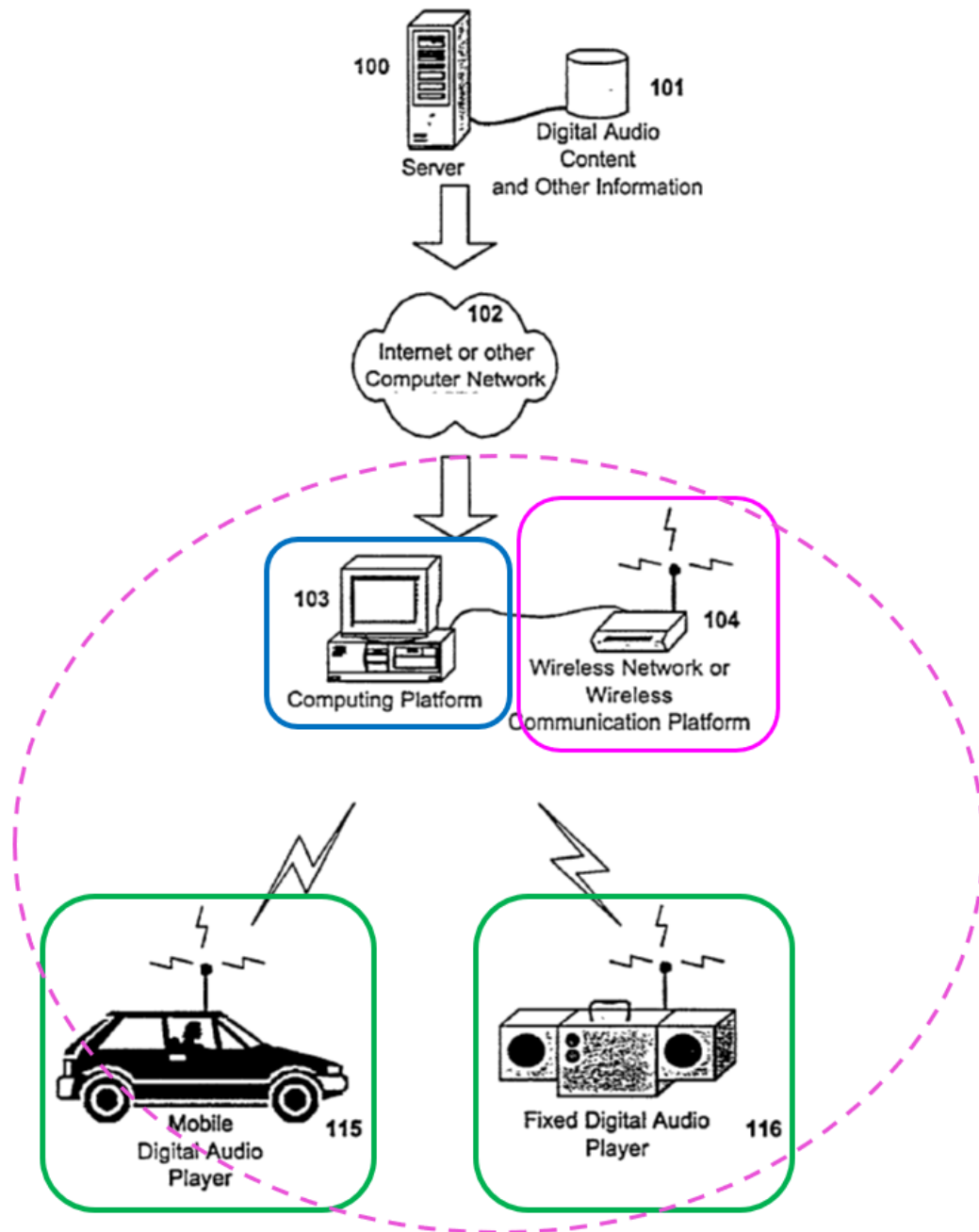
104. While Gassho describes its invention mainly in a networked printer system setting (with a printer server as an embodiment of the “wireless communication device”), the network setting techniques disclosed by Gassho can apply to “various wireless communication devices including cordless phones, cell phones, and walkie-talkies” and others unnamed. EX1006, [0075].

D. Spurgat (EX1007)

105. Spurgat is directed to a digital playback device that “is configured to

enable wireless communication among other digital playback devices and/or a computing platform to allow synchronization and control.” EX1005, abstract.

106. Just like the HOUSEHOLD audio system in the ’883 patent, Spurgat discloses various embodiments with different configurations of a digital audio communication system that includes multiple digital audio players, a controller to control the digital audio players, and a gateway to the Internet to enable the digital audio players to access additional digital audio content. *See* EX1005, [0034]-[0057], FIGs. 1-7; EX1001, 9:1-20. For example, as shown in annotated FIG. 1 of Spurgat below, Spurgat specifically discloses a digital audio communication system (in pink-dashed oval) including computing platform 103, e.g., a computer, configured to communicate with “various digital audio players 115 and 116” via a wireless local area network formed by communication platform 104, e.g., an access point. EX1005, [0034]-[0036], FIG. 1.



EX1007, FIG. 1 (Annotated)

107. Just like the playback device in the '883 patent, Spurgat discloses that the digital audio player synchronizes digital audio content, such as playlists, with other digital audio players, which allows a user to move from one player to another

and able to listen to “the same music and playlist in a seamless manner.” EX1005, [0036], [0043], [0099]; EX1001, 7:53-65. Spurgat also discloses that the digital audio players can be discovered and form “a list of players in proximity” for content synchronization, or they are added to a “list of players in proximity.” EX1005, [0092]-[0097].

IX. Grounds 1-2: Rector Anticipates Or Renders Obvious Claims 1-20

A. Independent Claim 1

108. Claim 1 is reproduced below. For ease of discussion, I have included a label for each claim limitation.

[1.P] A playback device comprising:

[1.a] a network interface that is configured to provide an interconnection with at least one data network;

[1.b] at least one processor;

[1.c] a non-transitory computer-readable medium; and

[1.d] program instructions stored on the non-transitory computer-readable medium that, when executed by the at least one processor, cause the playback device to perform functions comprising:

[1.e.1] detecting a triggering event that causes the playback device to enter a setup mode in which the playback device transmits at least a first message indicating that the playback device is available for setup;

[1.e.2] while in the setup mode, receiving a response to the first message that facilitates establishing an initial communication path with

a computing device that is installed with an application for controlling the playback device, wherein the computing device is operating on a secure wireless local area network (WLAN) that is defined by an access point, wherein the initial communication path with the computing device does not traverse the access point;

[1.e.3] receiving, from the computing device via the initial communication path, at least a second message containing network configuration parameters for the secure WLAN, wherein the network configuration parameters comprise an identifier of the secure WLAN and a security key for the secure WLAN;

[1.e.4] using the network configuration parameters to connect to the secure WLAN that is defined by the access point; and

[1.e.5] transitioning from communicating with the computing device via the initial communication path to communicating with the computing device via the secure WLAN that is defined by the access point.

1. [1.P] A playback device comprising

109. Rector discloses that the network device 112, in one embodiment, “comprises an audio device that receives data over a network and plays the audio data through loudspeakers” (“*playback device*”). EX1004, [0021]; *see also* EX1004, [0003], [0005], FIG. 2. Accordingly, Rector discloses a *playback device*.

110. My conclusion does not change to the extent the claim construction from the Google ITC Case is applied. I understand, in the Google ITC Case, the

parties to that case agreed that the term “playback device” should be construed to mean a “data network device configured to process and output audio.” The above-described network device is a *data network device* because it “receives data over a network” and is *configured to process and output audio* because it “plays the audio data through loudspeakers.” EX1004, [0021].

2. [1.a] a network interface that is configured to provide an interconnection with at least one data network;

111. Rector’s network device 112 can establish connections to components such as gateway component 106 and proximity setup component 108, both of which are *data networks*. EX1004, [0021]. For example, Rector discloses network device 112 can be “an audio device that receives data over a network and plays the audio data through loudspeakers.” EX1004, [0021]. The network device 112 is also described as being able to receive network configuration parameters on connection 202. EX1004, [0024]-[0025].

112. Rector further discloses that “a network interface,” such as an infra-red network interface or a radio frequency network interface, will be used “for establishing connections on a network.” EX1004, [0018]. Rector describes the network device 112 using infra-red wireless connections, wired connections, and other types of connections. EX1004, [0023]. A POSITA reading Rector will recognize that Rector discloses network device 112 must also have *a network*

interface configured to provide an interconnection with at least one data network in order to perform these functions. As a further illustration, Rector describes embodiments wherein the “proximity setup component provides a wired network interface” and that “[n]etwork connection 202 ... can be a wired connection.” EX1004, [0018], [0023]. Accordingly, a POSITA would understand that Rector’s network device 112 contains a physical component of a device that provides an interconnection with a data network (*i.e.*, a *network interface*).

113. To the extent Rector does not inherently disclose that its network device contains *a network interface that is configured to provide an interconnection with at least one data network*, such a modification would be obvious in view of Rector’s ample disclosures related to connecting the network device 112 to a network. *See, e.g.*, EX1004, [0015]-[0032].

3. [1.b] at least one processor; [1.c] a non-transitory computer-readable medium; and [1.d] program instructions stored on the non-transitory computer-readable medium that, when executed by the at least one processor, cause the playback device to perform functions comprising:

114. Rector discloses that the network device 112 comprises *[1.b] at least one processor; [1.c] a non-transitory computer-readable medium; and [1.d] program instructions stored on the non-transitory computer-readable medium that, when executed by the at least one processor, cause the playback device to perform functions* described below.

115. Rector discloses that the network device 112 can be a variety of devices which necessarily include a “processor,” “a non-transitory computer readable medium” and “program instructions” for performing the various communication, data processing and output functions, such as “cell phones, PDAs, security systems” EX1004, [0021]. Rector particularly highlights the embodiment wherein “network device 112 comprises an audio device that receives data over a network and plays the audio data through loudspeakers” such as “the Gateway Connected Music Player available from Gateway, Inc.” EX1004, [0021]. A POSITA would recognize that such devices necessarily require a include a “processor,” “a non-transitory computer readable medium” and “program instructions” for performing the various communication, data processing and output functions.

116. Furthermore, Rector discloses that “computerized method,” such as the communication method of Rector FIG. 4 where network device 112 participates on the receiving side, “is desirably realized at least in part as one or more programs running on a computer—that is, as a program executed from a computer-readable medium such as a memory by a processor of a computer.” EX1004, [0026]. A POSITA would understand that this statement applies to both the network device 112 and the proximity setup component 108.

117. Accordingly, a POSITA reading Rector will recognize that Rector discloses network device 112 also has all the features recited in [1.b]-[1.d]. To the

extent such attributes are not inherent, a POSITA would find it obvious to modify a playback device to incorporate the elements described above in view of Rector's disclosures of (1) examples of playback devices and (2).

4. [1.e.1] detecting a triggering event that causes the playback device to enter a setup mode in which the playback device transmits at least a first message indicating that the playback device is available for setup;

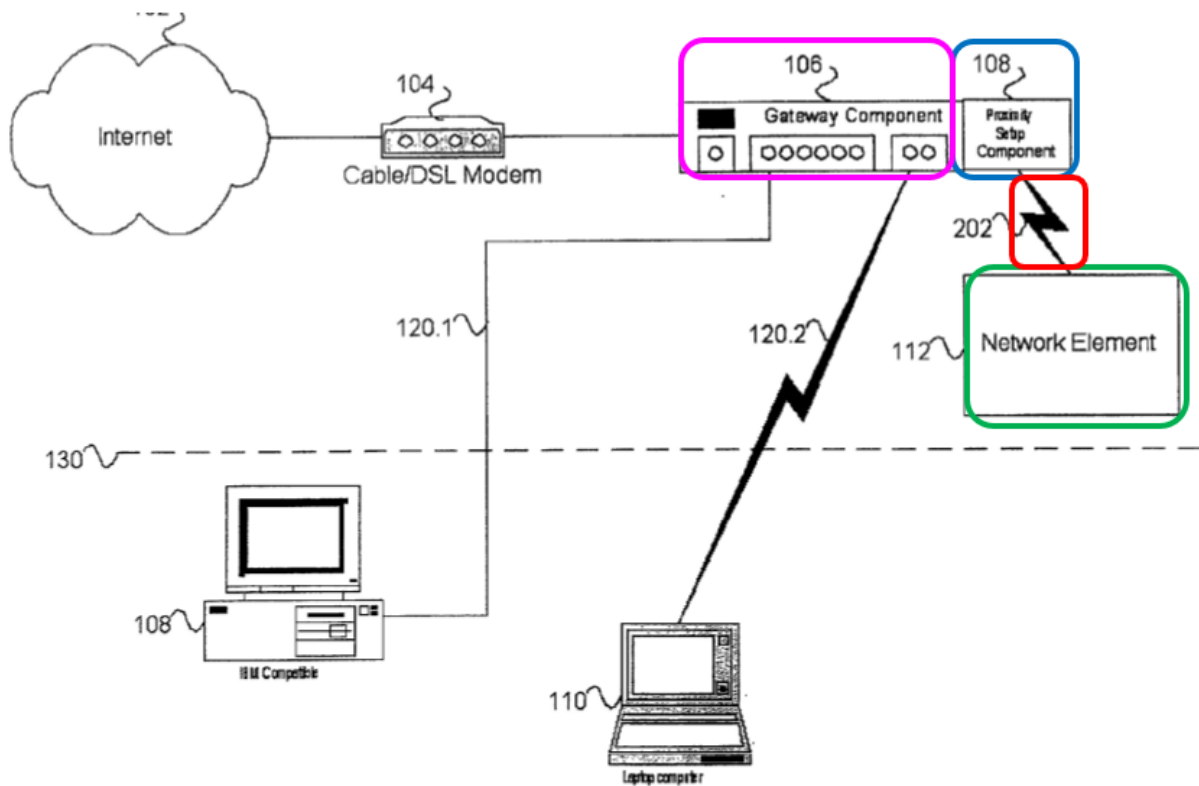
118. Rector *discloses detecting a triggering event that causes the playback device to enter a setup mode in which the playback device transmits at least a first message indicating that the playback device is available for setup.*

119. Rector discloses disclosing that network device 112 is powered on and brought into the proximity of boundary 130 (*i.e., triggering events*) that causes network device 112 (*playback device*) to enter a setup mode in which the network device 112 transmits a message (*first message*) to proximity setup component 108 that indicates network device 112 is in proximity (*available for setup*). See EX1004, [0022], [0023], [0028].

120. Rector discloses that "Bluetooth technology is used by proximity setup component 108 and network device 112 in order to determine that the network device is in proximity to setup component 108." EX1004, [0023]; see also, EX1004, [0028]. A POSITA would know that Rector discloses using Bluetooth device discovery for proximity setup component 108 to detect network device 112 in

proximity. In order for any device to be detected, it must be powered on and be able to communicate using Bluetooth. EX1009, 1138-1139.nd it must be in a discoverable mode, as defined in the Bluetooth standard. For example, according to the Bluetooth standard, the “limited discoverable mode should be used by devices that need to be discoverable only for a limited period of time, during temporary conditions or for a specific event.” EX1009, 1138. Therefore, the network device would necessarily need to be powered on. This mode minimizes security risks and power consumption. As shown in FIG. 2, Rector further discloses that network device needs to be “brought within proximity boundary 130,” and otherwise is “unable to communicate with proximity setup component 108” and thus not available for setup. EX1004, [0022], [0023]; *see also* FIG. 2 (showing device within proximity boundary 130). According to the Bluetooth standard, inquires or pages are “sent by a Bluetooth unit to discover the other Bluetooth units that are within the coverage area.” EX1008, 27-28. Therefore, by being “brought within proximity boundary,” network device 112 can be detected by proximity setup component 108, thus in a setup mode. A POSITA would understand network device 112 being brought into proximity and powered on for a secure network connection, as disclosed by Rector, to be necessary under the Bluetooth standards, that causes the device to enter the setup mode. Therefore, A POSITA would have understood that Rector discloses powering on network device 112 and/or bringing it into proximity

boundary line 130 constitute the “triggering event.”



EX1004, Fig. 2 (Annotated)

121. This triggering event will cause the network device 112 in a mode ready to be set up (“setup mode”). In that mode, network device 112 exchanges messages with proximity setup component 108 in order to establish the network connection 202. Rector discloses “it is desirable for network connection 202 to be an infra-red wireless connection.” EX1004, [0023]. However, Rector also provides that it “is not limited to any particular type of connection,” which can also use “a radio frequency (RF) connection” or the “Bluetooth protocol.” EX1004, claims 4-5.

122. Bluetooth discovery and IR discovery were both well-known to a

POSITA at the time. A POSITA would understand that under a Bluetooth protocol, there are two devices, an “inquiring device” which “actively sends inquiry requests” and a “discoverable device” which “listen[s] for these inquiry requests and send[s] responses.” EX 1009 at 111 51 (Bluetooth standard).

123. A POSITA would understand the network device 112 to be the inquiring device and the proximity setup component 108 to be the discoverable device because such a setup would minimize the processing power requirements of the system. As the discoverable device, the proximity setup component needs only listen to the appropriate Bluetooth channels and be ready to respond. To have the proximity setup component 108 be the inquiring device would require the proximity setup component to always be sending out inquiry requests. Sending out inquiring requests 24/7 decreases efficiency. The discoverable device, however, needs only send out inquiry requests during the narrow window when it is powered on and attempting to connect to the proximity setup component.

124. In light of that, a POSITA would understand the network device 112 to be the inquiring device. Accordingly, a POSITA would understand network device 112 would transmit a Bluetooth inquiry request (“*first message*”) that can be detected and interpreted as “*indicating that the playback device is available for setup.*” EX1009 at 111, 127 (Bluetooth Standard). Proximity setup component 108 will respond to network device 112’s inquiry request, to facilitate establishing connection

202 using Bluetooth protocol, which is explained further below for [1.e.2].

125. Alternatively, to establish the connection 202 using the infra-red (IR) protocol, as specified in Rector, a similar inquiry-response message exchange is required. A POSITA would understand that to establish an infra-red wireless connection, the proximity setup component 108 will have to exchange infrared pairing messages with the network device 112. As referenced above in Section VI.C, IR connections require “device discovery” whereby a device will identify itself to another.

As part of the device discovery process, the device passes a DeviceInfo field to the host.[IrLAP] The link management layer controls the content of that DeviceInfo field in the IrLAP discovery process. The DeviceInfo field contains a service hint mask which has a single bit field defined that when set, states that the responding IrDA compliant device is Plug and Play ready.³⁹

126. Specifically, IRDA explains that during discovery, the new device (here network device 112 is a new device) sends the host (here proximity setup component 108 is the host) its “status” information (“*first message*”) identifying whether it is available for certain connections and services, known as “Plug and Play ready.” EX1010, pg. 5. According to the standard, the DeviceInfo “is a bit field that is used by a device to convey status to the host at discovery time.” EX1010, pg. 9. The host then responds to the new device. EX1010, pg. 5, 9, 12.

³⁹ [EX1010, pg. 5]

127. To the extent any of the above is not inherent to Rector's disclosures, it would be obvious for a POSITA to modify Rector's invention to have the network device 112 be the inquiring device for the reasons stated above.

5. [1.e.2] while in the setup mode, receiving a response to the first message that facilitates establishing an initial communication path with a computing device that is installed with an application for controlling the playback device, wherein the computing device is operating on a secure wireless local area network (WLAN) that is defined by an access point, wherein the initial communication path with the computing device does not traverse the access point;

128. Rector discloses that *while in the setup mode, receiving a response to the first message that facilitates establishing an initial communication path with a computing device that is installed with an application for controlling the playback device, wherein the computing device is operating on a secure wireless local area network (WLAN) that is defined by an access point, wherein the initial communication path with the computing device does not traverse the access point.*

129. Specifically, Rector discloses that network device 112 receives response to its first message indicating its availability, which facilitates establishing a connection 202 ("*initial communication path*") with proximity setup component 108 (*computing device*) that has programs running thereon to control at least the setup of network device 112 (*application for controlling the playback device*). EX1004, [0023]. Rector provides that "[u]pon detecting that network device 112 is in proximity, proximity setup component 108 establishes a network connection 202

with network device 112.” EX1004, [0023].

130. an “inquiring device” which “actively sends inquiry requests” and a “discoverable device” which “listen[s] for these inquiry requests and send[s] responses.” EX 1009 at 51 (Bluetooth standard). Therefore, a POSITA would understand that proximity setup device 108 (the discoverable device) will send an response to network device 112’s (the inquiring device) initial Bluetooth inquiry request (“*a response to the first message*”), which facilitates establishing connection 202 (“an initial communication path”) under the Bluetooth protocol. Specifically, the Bluetooth core specification discloses a “Service Discovery Protocol” (“SDP”) for determining what services are available on a newly established connection. The specification explains, however, that before services may be discovered, “a potential client must be notified by a means other than the SDP so that the client can use SDP to query the server about the services.” EX1009 (Bluetooth Standard), 1066. A POSITA would understand the specification to provide that establishing connections requires an exchange of messages to and from the two devices, including at least one inquiry request message (“*first message*”) indicating availability (by network device 112) and an inquiry response message (by proximity setup device 108) responding to said availability message (“*response to the first message*”).

131. Similarly, under the IR protocol, a response to the “status” information sent from network device 112 (a new device) to proximity setup component 108 (a

host) (“a response to the first message”) is required to establish the IR connection. According to the standard, “the host must determine the capabilities of the device. The IrLMP specification defines an Information Access Service (IAS) to allow devices to exchange information about device capabilities.” EX1010, 5, 9 (“Therefore, in order for a host to determine if a PnP device’s status has changed the host must request the IAS PnP Class information.”).

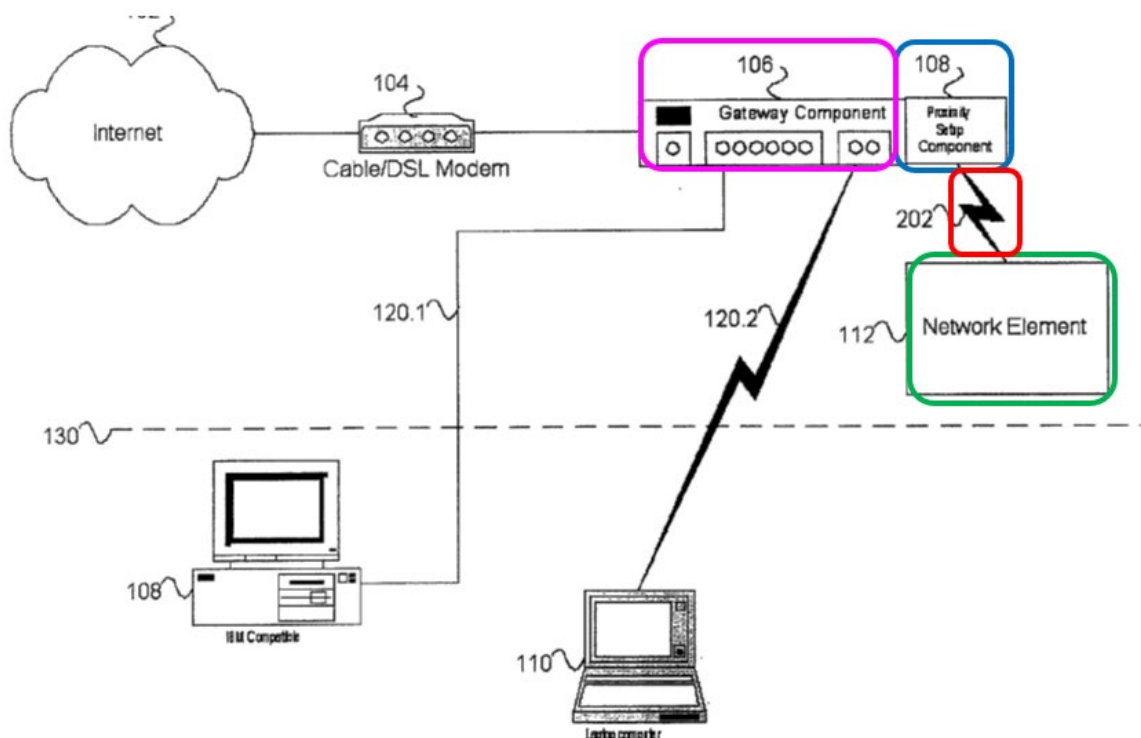


FIG. 2

EX1004, Fig. 2 (Annotated)

132. To the extent the Rector does not inherently disclose the above, a POSITA would have found it obvious to transmit a response to network device 112

because establishing a direct network connection between devices requires each device to configure the connection in the same way. Accordingly, the only way to establish such a direct connection between device 112 and setup device 108 is for setup device 108 to respond to device 112 confirming the configuration of the direct connection. Such a process improves security in the subsequent transmission of the network configuration parameters by allowing the two devices to use non-default settings, which is the only alternative to exchanging messages back and forth before connection. Thus, it is my opinion a POSITA would be motivated to improve security in this fashion, achieving the stated goal of Rector. *See* EX1004, [0006].

133. Rector discloses that while the proximity setup component 108 (*i.e.*, computing device) *is operating on a secure wireless local area network (WLAN) that is defined by an access point*. Rector provides that “[p]roximity setup component communicates with gateway component 106 through a network such as network 120.” EX1004, [0020]. This network 120 can include various types of network connections, including wireless network connections 120.2, which “is a connection supporting the IEEE 802.11b protocol with encryption enabled.” EX1004, [0016], [0017]. Rector further discloses that gateway component 106 can be, among others, “router, wireless access point, or residential gateway.” EX1004, [0016]. Accordingly, a POSITA would understand Rector to disclose an embodiment of local network 120 as a WLAN defined by gateway component 106

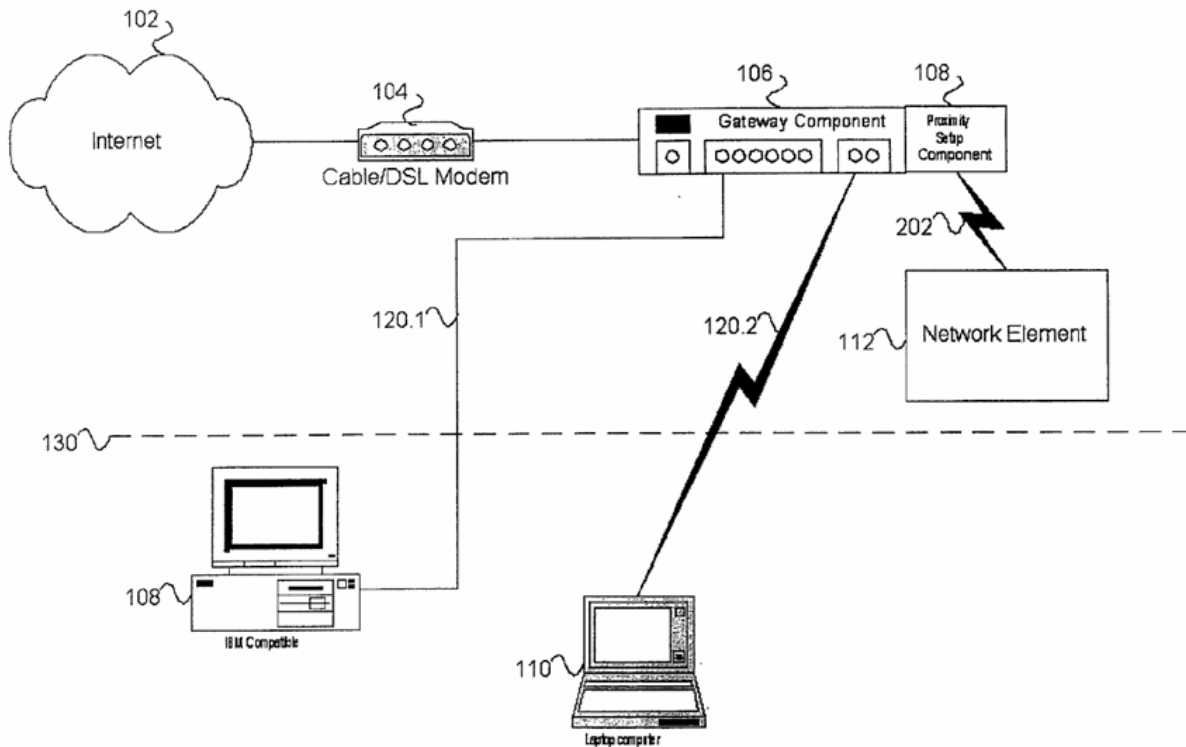
as an access point.⁴⁰

134. Rector discloses proximity setup component 108 to be a computer with processor and memory and running programs to realize computerized methods, such as that of FIG. 4 (“*application for controlling the playback device*”). Specifically, Rector provides that “in one embodiment, a computer program module is executed by a processor of a computer from a medium to provide configuration and setup information to a network device.” EX1004, [0026] (“[t]he computerized method is desirably realized at least in part as one or more programs running on a computer”). Proximity setup component 108 either is integrated with gateway component 106 (FIG. 1A) or communicates with 106 “through a network such as network 120” (FIG. 1B). EX1004, [0007], [0020]. Therefore, a POSITA would understand the proximity setup component 108 to be a “*computing device [] operating on the secure WLAN.*”

135. Rector also discloses that the connection 202 (“*the initial communication path*”) established by proximity setup component 108 “is separate

⁴⁰ Rector contemplates that network 120 can be a wireless data communications network spanning a limited geographical area, such as an office, an entire building, or industrial part. For example, in its background section, Rector describes that “[c]omputer networks, once found only in large companies, are now commonly found in all sorts and sizes of companies” and mentions networks specific to individual people’s homes which “allow their computers to communicate with one another.” EX1004, [0002]. Rector describes an “office network” and a “home network.” EX1004, [0002]. Accordingly, a POSITA would understand Rector to disclose networks which are geographically limited, such as for homes and offices.

from network 120,” thus “*does not traverse the access point.*” EX1004, [0018], [0029]. This is depicted in Figure 2 as two separate connections: 120 and 202.



EX1004, Fig. 2

6. [1.e.3] receiving, from the computing device via the initial communication path, at least a second message containing network configuration parameters for the secure WLAN, wherein the network configuration parameters comprise an identifier of the secure WLAN and a security key for the secure WLAN;

136. Rector discloses receiving, from the computing device via the initial communication path, at least a second message containing network configuration parameters for the secure WLAN, wherein the network configuration parameters comprise an identifier of the secure WLAN and a security key for the secure WLAN.

137. Rector discloses that the network device 112 (*“playback device”*) receives from proximity setup component 108 (*“computing device”*), via connection 202 (*“initial communication path”*), the network configuration parameters required to connect to network 120 (*“at least a second message containing network configuration parameters for the secure WLAN”*). Specifically, Rector provides that “[o]nce a connection 202 has been established, proximity setup component 102 can provide configuration and setup data to network element 112” via connection 202. EX1004, [0024]; *see also* EX1004, [0030] (*“configuration data for the first network is sent over the second network to the network device (block 408)”*).

138. Furthermore, these network configuration parameters received by the network device 112 include SSID (*“an identifier of the secure WLAN”*) and the encryption key (*“a security key for the secure WLAN”*). Rector explains that “this data includes the SSID, wireless channel, and encryption keys necessary to allow network device 112 to communicate on network 120.” EX1004, [0024]; *see also* EX1004, [0017] (describing information necessary to connect to the WLAN network), [0030] (*“[i]n some embodiments, this configuration data includes an SSID, channel, and encryption key for the first network.”*).

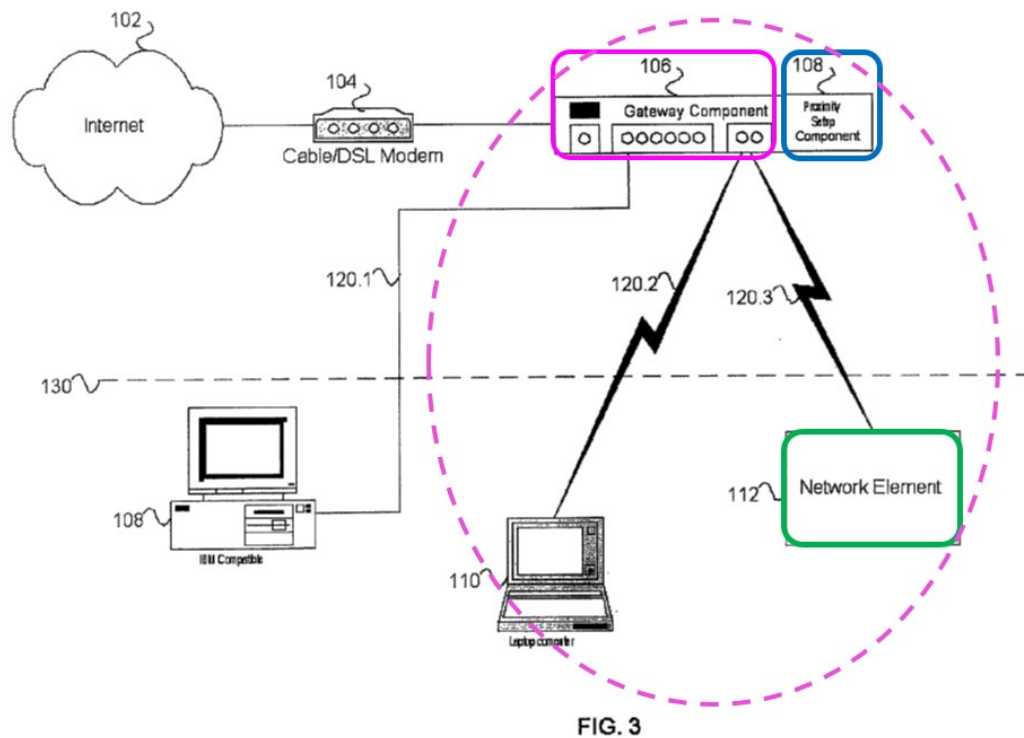
7. [1.e.4] using the network configuration parameters to connect to the secure WLAN that is defined by the access point; and

139. Rector discloses *using the network configuration parameters to connect*

to the secure WLAN that is defined by the access point.

140. Rector discloses that network device 112 uses the network configuration parameters it received from proximity setup component 108 to connect to network 120 (“*the secure WLAN*”) that is defined by gateway component 106 (“*access point*”). As shown below, Rector describes the network device 112 “establish[ing] a connection 120.3 with gateway component 106 allowing network device 112 to communicate with any device on network 120.” EX1004, [0025].

141. Furthermore, as discussed above, this network 120 can be a WLAN defined by an access point, gateway component 106. *See* EX1004, [0016]-[0017]. Accordingly, a POSITA would understand Rector to disclose *using the network configuration parameters to connect to the secure WLAN that is defined by the access point.*



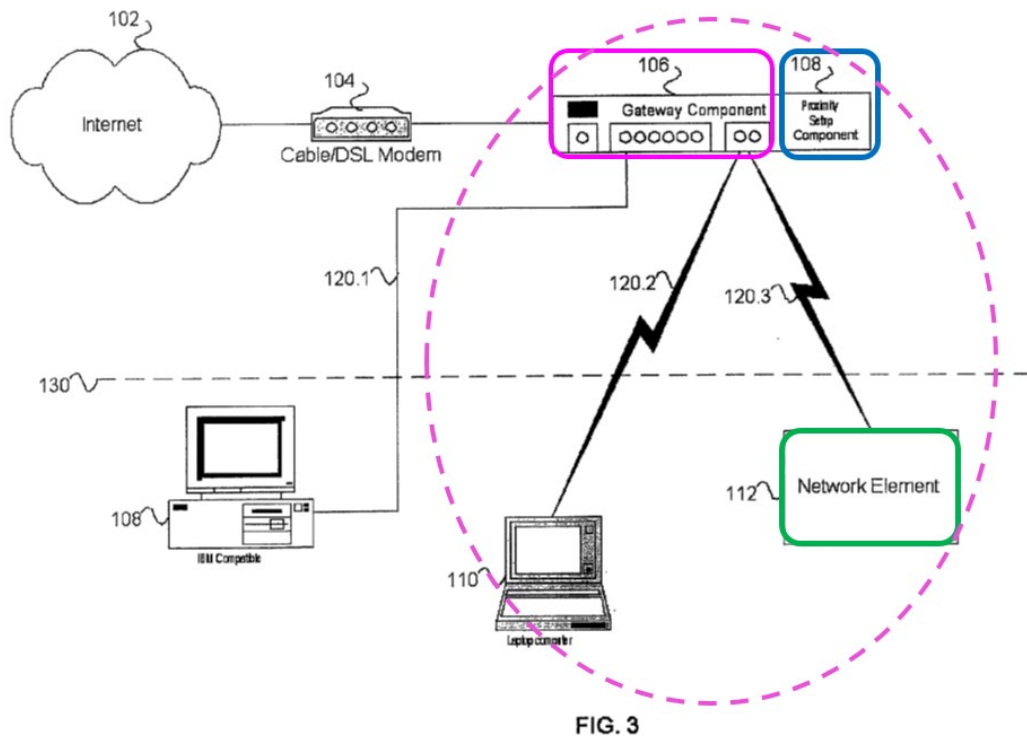
EX1004, Fig. 3 (Annotated)

8. [1.e.5] *transitioning from communicating with the computing device via the initial communication path to communicating with the computing device via the secure WLAN that is defined by the access point.*

142. Rector discloses *transitioning from communicating with the computing device via the initial communication path to communicating with the computing device via the secure WLAN that is defined by the access point.*

143. Rector discloses that the that network device 112 switches from communicating with proximity setup component 108 via connection 202 (“*initial communication path*”) to network 120 (“*the secure WLAN*”) that is defined by gateway component 106 (“*access point*”). Rector explains that “after network device

112 has received configuration and setup information,” it may be “moved beyond proximity boundary 130,” so that it will disconnect from connection 202 and “compute with any device on network 120.” EX1004, [0025]. Accordingly, a POSITA would understand that at this point, the network device 112 has transitioned from communicating with the computing device via the initial communication path (*i.e.* connection 202) and is instead using the secure WLAN that is defined by the access point (*i.e.*, network 120).



EX1004, Fig. 3 (Annotated)

B. Dependent Claim 2: The playback device of claim 1, wherein the triggering event comprises one of (a) powering on the playback device or (b) receiving user input via a physical interface of the playback device.

144. Rector discloses *the playback device of claim 1, wherein the triggering event comprises one of (a) powering on the playback device or (b) receiving user input via a physical interface of the playback device.*

145. As explained above for claim 1.e.1, both powering on the network device 112 or bringing the network device into proximity of the proximity setup component constitute *triggering events*. See EX1004, [0022]-[0023].

146. A POSITA would understand that in order for the system of Rector to function, the device must necessarily be powered on. Therefore, powering on the device while in proximity to the proximity setup component would constitute a triggering event. Accordingly, *the triggering event comprises ... powering on the playback device.*

147. A POSITA would also understand that in order for the network device 112 to be “brought within proximity boundary 130,” the user must necessarily provide input onto the physical interface of the playback device by carrying the playback device within the boundary. Accordingly, *the triggering event comprises ... receiving user input via a physical interface of the playback device.*

C. Dependent Claim 3: The playback device of claim 1, wherein the computing device comprises a controller device of a networked audio system.

148. Rector discloses *the playback device of claim 1, wherein the computing device comprises a controller device of a networked audio system.*

149. As discussed above for claims 1.a and 1.e.2, the network device 112 can be “an audio device that receives data over a network and plays the audio data through loudspeakers,” EX1004, [0021], and the proximity setup component 108 can be a computer functioning as a controller to network device 112. EX1004, [0026] (“[t]he computerized method is desirably realized at least in part as one or more programs running on a computer”). Because the proximity setup component is connected to the network device (which may be an audio device) through a network 120, Rector therefore discloses a *networked audio system* controlled by the proximity setup component (*i.e., control device*). See EX1004, [0024]-[0025].

150. Rector even indicates that there can be multiple devices on this *networked audio system*. Specifically, Rector expressly discloses “audio devices can be connected to the network that receive audio files from a source in the network and play them through a loudspeaker,” and that the disclosed “invention is not limited in any way by . . . number of devices connected to gateway component 106.” EX1004, [0003], [0016]. Indeed, Figures 1-3 all show multiple devices connected via the network 120. From this, a POSITA would understand that Rector discloses

that multiple audio devices can be setup and receive playback data over the network. To the extent this is not expressly disclosed, a POSITA would find it obvious to connect more than one device to the network 120 in order to allow the audio devices to playback data they receive over the network. *See* EX1004, [0003]; *see also* EX1004, [0016], FIGs. 1-3.

D. Dependent Claim 4: The playback device of claim 1, further comprising program instructions stored on the non-transitory computer-readable medium that, when executed by the at least one processor, cause the playback device to perform functions comprising:

151. Rector discloses *the playback device of claim 1, further comprising program instructions stored on the non-transitory computer-readable medium that, when executed by the at least one processor, cause the playback device to perform the below. See Claim 1.d.*

1. after receiving the second message, providing an indication that the playback device has successfully received the network configuration parameters for the secure WLAN.

152. Rector discloses *after receiving the second message, providing an indication that the playback device has successfully received the network configuration parameters for the secure WLAN.*

153. With respect to Figure 3, Rector discloses “after network device 112 has received configuration and setup information,” it may be “moved to its desired location.” EX1004, [0025]. However, the proximity setup component is designed

such that it cannot establish a connection 202 outside of the proximity boundary line 130. *See* EX1004, [0019] (“The network interface for proximity setup component 108 is typically chosen to have a limited range, illustrated by proximity boundary line 130.”). Accordingly, a POSITA would realize that the network device 112 should not be moved until after *the playback device has successfully received the network configurations parameters for the secure WLAN and connected to the WLAN* so as to make sure the network device 112 successfully connects to the network 120.

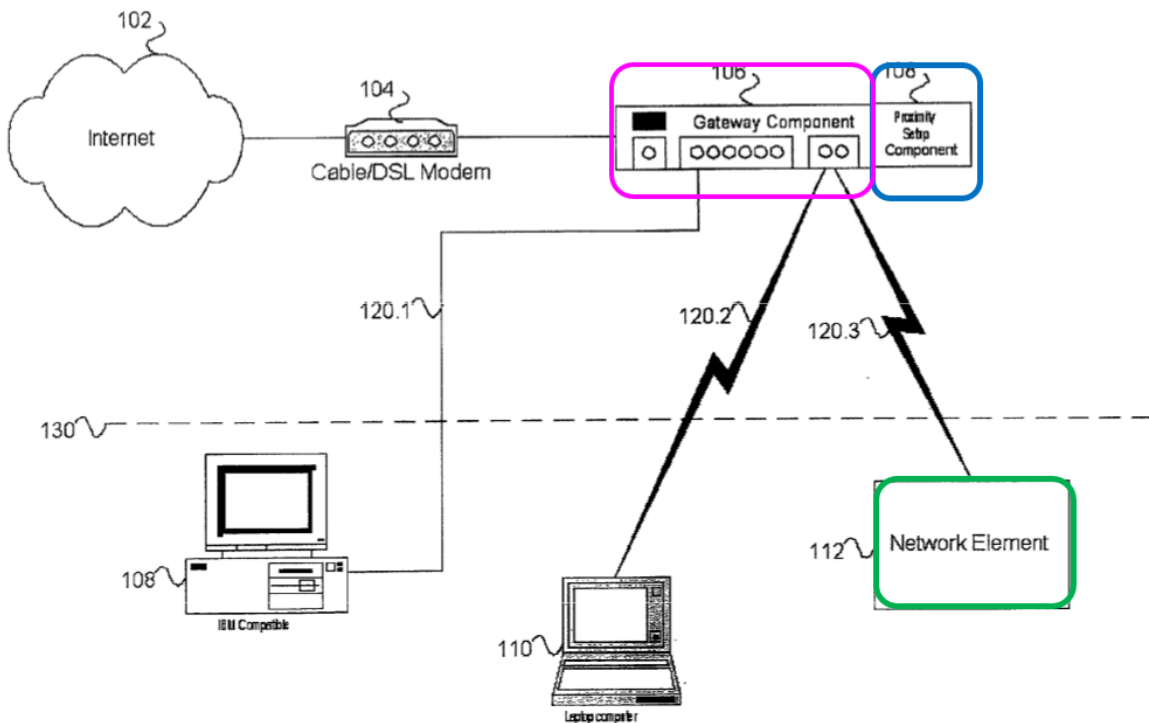


FIG. 3

EX1004, FIG. 3 (Annotated)

154. Accordingly, a POSITA would understand that for network device 112 (“*playback device*”) to be moved, it necessarily has to indicate that *network device 112 has received configuration and setup information* and that the network device 112 has successfully connected to the WLAN so that the user knows it is safe to begin moving the network device 112. To the extent this is not inherently disclosed by Rector, a POSITA would find such a modification obvious to enhance the usability and reliability of the system.

- E. Dependent Claim 5: The playback device of claim 4, wherein providing the indication comprises transmitting, to the computing device via the initial communication path, at least a third message indicating that the playback device has successfully received the network configuration parameters.**

155. Rector discloses *the playback device of claim 4, wherein providing the indication comprises transmitting, to the computing device via the initial communication path, at least a third message indicating that the playback device has successfully received the network configuration parameters.*

156. As discussed above for Claim 4, a POSITA would have understood that an indication needs to be provided that “network device 112 has received configuration and setup information.” EX1004, [0025].

157. Rector discloses that, “it is desirable for network connection 202 to be an infra-red wireless connection.” EX1004, [0023]. To the extent Rector does not explicitly disclose the indication in the form of a message transmitted over

connection 202, it is inherent as infra-red communication standard requires network device 112 to send an acknowledging message, over connection 202, after receiving the configuration data from component 108. EX 1010, 11 (“a device can send responses only when it is polled by a host”). Therefore, A POSITA would have understood, or at least found obvious, that a message, such as an Infra-red (“third message”), is necessarily transmitted via the connection 202, such as an IR connection (“the initial communication path”) to acknowledge that the configuration data is successfully received.

158. To the extent this disclosure is not inherent, a POSITA would have found it obvious to transmit the indication as a message via connection 202 because doing so would allow proximity setup component 108 to understand configuration is successful and therefore terminate the setup process, preserving the efficiency and security of the system, which are factors which Rector values. EX1004, [0006] (“there is a need in the art for a way to easily configure new network devices without compromising the security of the network.”)

F. Dependent Claim 6: The playback device of claim 4, wherein providing the indication comprises providing an indication that the playback device has successfully connected to the secure WLAN using the network configuration parameters.

159. Rector discloses *the playback device of claim 4, wherein providing the indication comprises providing an indication that the playback device has*

successfully connected to the secure WLAN using the network configuration parameters.

160. As discussed for Claim 4, Rector discloses providing an indication that “network device 112 has received configuration and setup information.” Rector also discloses that with the received configuration data, network device 112 will “establish a connection 120.3 with gateway component 106”, “communicate with any device on network 120,” and “receive[] data over [the] network and play[] the audio data.” EX1004, [0021], [0025]. A POSITA would have understood any of these actions by network device 112 to reach out to devices on the network (connecting to gateway component 106, communicating with other networked device, or receiving audio data over the network) is “*an indication that the playback device has successfully connected to the secure WLAN using the network configuration parameters.*”

161. As discussed above for claim 4, a POSITA would understand that for network device 112 (“playback device”) to be moved outside the proximity boundary line, it necessarily has to indicate that the network device 112 has successfully connected to the WLAN so that the user knows it is safe to begin moving the network device 112. *See* EX1004, [0025].

162. To the extent this is not inherently disclosed by Rector, a POSITA would find such a modification obvious to enhance the usability and reliability of

the system. A POSITA would have found it straightforward, routine, and advantageous to provide such an indication explicitly such as a message and would have found explicit motivation in Rector to do so to allow other devices or the user to understand the connection is successful and therefore ready for use on the network. A POSITA would have known including such an indication would predicably work and provide expected results.

G. Dependent Claim 7: The playback device of claim 1, further comprising program instructions stored on the non-transitory computer-readable medium that, when executed by the at least one processor, cause the playback device to perform functions comprising:

163. Rector discloses *the playback device of claim 1, further comprising program instructions stored on the non-transitory computer-readable medium that, when executed by the at least one processor, cause the playback device to perform the below. See Claim 1.d.*

1. after connecting to the secure WLAN, establishing a new networked audio system on the secure WLAN.

164. As discussed above for Claim 3, Rector discloses that, after connecting to network 120, the network device 112 “establish[s] a connection 120.3 with gateway component 106.” EX1004, [0025]. Rector also describes that the network device can be an “audio device that receives data over a network and plays the audio data through loudspeakers.” EX1004, [0021]. A POSITA would understand that this

procedure can include receiving data from “external network 102.” *See* EX1004, [0016]. A POSITA would therefore understand that Rector discloses after connecting to network 120, network device 112 and component 108 form “a new networked audio system on the secure WLAN,” recited by Claim 7.

165. To the extent the Board finds the disclosure does not explicitly disclose the elements above, a POSITA would have found it obvious to have newly connected network device 112 to “form a new networked audio system” because doing so will allow the audio devices to playback data they receive from other devices over the network, which is a stated goal of Rector. EX1004, [0003].

H. Dependent Claim 8: The playback device of claim 1, further comprising program instructions stored on the non-transitory computer-readable medium that, when executed by the at least one processor, cause the playback device to perform functions comprising:

166. Rector discloses *the playback device of claim 1, further comprising program instructions stored on the non-transitory computer-readable medium that, when executed by the at least one processor, cause the playback device to perform the below. See Claim 1.d.*

1. after connecting to the secure WLAN, joining an existing networked audio system operating on the secure WLAN.

167. Rector further discloses that multiple “audio devices can be connected to the network that receive audio files from a source in the network and play them

through a loudspeaker.” EX1004, [0016]. Therefore, a POSITA would understand that Rector discloses to the extent an audio device is already connected to network 120, it would have formed “an existing networked audio system operating on the secure WLAN” as in Claim 7. Indeed, Figures 1-3 of Rector already show at least two computers connected to the network. EX1004, Figs. 1-3, [0016] (“wired connection 120.1 to desktop PC 108 and the wireless connection 120.2 to laptop PC 110.”). A POSITA would understand that either computer would be able to play music, and thus the new network device 112 may be joining an existing networked audio system.

168. To the extent the Board finds the disclosure does not explicitly disclose the elements above, a POSITA would have found it obvious to have newly connected network device 112 to “join an existing networked audio system” because doing so will allow the audio devices to playback data they receive from other devices over the network, which is a stated goal of Rector. EX1004, [0003].

I. Dependent Claim 10: The playback device of claim 1, wherein communicating with the computing device via the secure WLAN comprises receiving a command related to playback of audio content.

169. Rector discloses *the playback device of claim 1, wherein communicating with the computing device via the secure WLAN comprises receiving a command related to playback of audio content.*

170. Rector discloses network device 112 “receives data over a network and plays the audio data through loudspeakers.” EX1004, [0021]. In order for the audio device to properly playback the audio data, such data necessarily includes *a command related to playback of audio content*. EX1004, [0021].

- J. Dependent Claim 11: The playback device of claim 10, wherein the command comprises a command to retrieve audio content for playback from an audio source that is accessible via a communication path that includes the secure WLAN, and wherein the playback device further comprises program instructions stored on the non-transitory computer-readable medium that, when executed by the at least one processor, cause the playback device to perform functions comprising: in response to receiving the command, retrieving the audio content from the audio source via the communication path that includes the secure WLAN**

171. Rector discloses *the playback device of claim 10, wherein the command comprises a command to retrieve audio content for playback from an audio source that is accessible via a communication path that includes the secure WLAN, and wherein the playback device further comprises program instructions stored on the non-transitory computer-readable medium that, when executed by the at least one processor, cause the playback device to perform functions comprising: in response to receiving the command, retrieving the audio content from the audio source via the communication path that includes the secure WLAN.*

172. Rector discloses that audio devices can receive audio files (“*audio content for playback*”) from a source (“*audio source*”) in the network (“*accessible*

via a communication path that includes the secure WLAN”) and play them back. EX1004, [0003] (“audio devices can be connected to the network that receive **audio files from a source in the network** and play them through a loudspeaker.”), [0021]. For the audio devices to receive such audio files, it necessarily has to receive a command that instructs it to retrieve them and then it goes to retrieve in response to that command.

173. To the extent the Board finds the disclosure is not explicit or inherent, a POSITA would have found it obvious to include a command or commands for the audio devices to search directories, locate by name and transfer (the whole process is retrieving) the audio files because doing so allows the audio devices to obtain the correct audio files for playback.

K. Dependent Claim 12: The playback device of claim 1, wherein the second message comprises a command for the playback device to adopt the network configuration parameters.

174. Rector discloses *the playback device of claim 1, wherein the second message comprises a command for the playback device to adopt the network configuration parameters.*

175. As discussed for [1.e.3], Rector explicitly discloses that network device 112 receives a “*second message*” that includes the “*network configuration parameters.*” See, e.g., EX1004, [0017], [0024], [0030]. Rector further emphasizes that “devices connecting to gateway component 106 **must be configured** with

communications parameters to enable the devices communicate over network 120.” EX1004, [0017]. Therefore, a POSITA would understand that the second message necessarily includes a “*command*” for network device 112 to adopt those received network configuration parameters, as otherwise it will not be able to connect to network 120.

176. To the extent the Board finds the disclosure is not explicit or inherent, a POSITA would have found it obvious to include such a command because otherwise network device 112 cannot connect, defeating the purpose of invention. EX1004, [0006] (describing the goal to connect audio devices to the network).

L. Independent Claim 14

177. Claim 14 is reproduced below. For ease of discussion, I have included a label for each claim limitation.

[14.P] A non-transitory, computer-readable storage medium, wherein the non-transitory computer-readable storage medium is provisioned with program instructions that are executable to cause a playback device to perform functions comprising:

[14.a] detecting a triggering event that causes the playback device to enter a setup mode in which the playback device transmits at least a first message indicating that the playback device is available for setup;

[14.b] while in the setup mode, receiving a response to the first message that facilitates establishing an initial communication path with a computing device that is installed with an application for controlling

the playback device, wherein the computing device is operating on a secure wireless local area network (WLAN) that is defined by an access point, wherein the initial communication path with the computing device does not traverse the access point;

[14.c] receiving, from the computing device via the initial communication path, at least a second message containing network configuration parameters for the secure WLAN, wherein the network configuration parameters comprise an identifier of the secure WLAN and a security key for the secure WLAN;

[14.d] using the network configuration parameters to connect to the secure WLAN that is defined by the access point; and

[14.e] transitioning from communicating with the computing device via the initial communication path to communicating with the computing device via the secure WLAN that is defined by the access point.

178. The claim limitations in column 1 share substantial similarities with the corresponding claim limitations in column 2. Accordingly, Rector discloses, teaches, or suggests the claim limitations in column 2 for the same reasons as explained for the corresponding limitation in column 1.

<u>Column 1: Claim 1</u>	<u>Column 2: Claim 14</u>
[1.c] a non-transitory computer-readable medium; and [1.d] program instructions stored on the non-transitory computer-readable medium that, when executed by the at least one processor, cause the playback	[14.P] A non-transitory, computer-readable storage medium, wherein the non-transitory computer-readable storage medium is provisioned with program instructions that are executable to cause a playback device to perform functions comprising:

device to perform functions comprising:	
[1.e.1] detecting a triggering event that causes the playback device to enter a setup mode in which the playback device transmits at least a first message indicating that the playback device is available for setup;	[14.a] detecting a triggering event that causes the playback device to enter a setup mode in which the playback device transmits at least a first message indicating that the playback device is available for setup;
[1.e.2] while in the setup mode, receiving a response to the first message that facilitates establishing an initial communication path with a computing device that is installed with an application for controlling the playback device, wherein the computing device is operating on a secure wireless local area network (WLAN) that is defined by an access point, wherein the initial communication path with the computing device does not traverse the access point;	[14.b] while in the setup mode, receiving a response to the first message that facilitates establishing an initial communication path with a computing device that is installed with an application for controlling the playback device, wherein the computing device is operating on a secure wireless local area network (WLAN) that is defined by an access point, wherein the initial communication path with the computing device does not traverse the access point;
[1.e.3] receiving, from the computing device via the initial communication path, at least a second message containing network configuration parameters for the secure WLAN, wherein the network configuration parameters comprise an identifier of the secure WLAN and a security key for the secure WLAN;	[14.c] receiving, from the computing device via the initial communication path, at least a second message containing network configuration parameters for the secure WLAN, wherein the network configuration parameters comprise an identifier of the secure WLAN and a security key for the secure WLAN;
[1.e.4] using the network configuration parameters to connect to the secure WLAN that is defined by the access point; and	[14.d] using the network configuration parameters to connect to the secure WLAN that is defined by the access point; and
[1.e.5] transitioning from communicating with the computing device via the initial communication path to communicating with the computing device via the secure WLAN that is defined by the access point.	[14.e] transitioning from communicating with the computing device via the initial communication path to communicating with the computing device via the secure WLAN that is defined by the access point.

- M. Dependent Claim 15: The non-transitory, computer-readable storage medium of claim 14, wherein the triggering event comprises one of (a) powering on the playback device or (b) receiving user input via a physical interface of the playback device.**

179. This claim is substantively identical to claim 2. Accordingly, Rector discloses, teaches, or suggests this claim for the same reasons discussed above.

- N. Dependent Claim 16: The non-transitory, computer-readable storage medium of claim 14, wherein the non-transitory computer-readable medium is also provisioned with program instructions that are executable to cause the playback device to perform functions comprising: after receiving the second message, providing an indication that the playback device has successfully received the network configuration parameters for the secure WLAN.**

180. This claim is substantively identical to claim 4. Accordingly, Rector discloses, teaches, or suggests this claim for the same reasons discussed above.

- O. Dependent Claim 17: The non-transitory, computer-readable storage medium of claim 16, wherein providing the indication comprises transmitting, to the computing device via the initial communication path, at least a third message indicating that the playback device has successfully received the network configuration parameters.**

181. This claim is substantively identical to claim 6. Accordingly, Rector discloses, teaches, or suggests this claim for the same reasons discussed above.

- P. Dependent Claim 18: The non-transitory, computer-readable storage medium of claim 16, wherein providing the indication comprises providing an indication that the playback device has successfully connected to the secure WLAN using the network configuration parameters.**

182. This claim is substantively identical to claim 6. Accordingly, Rector discloses, teaches, or suggests this claim for the same reasons discussed above.

- Q. Dependent Claim 19: The non-transitory, computer-readable storage medium of claim 14, wherein communicating with the computing device via the secure WLAN comprises receiving a command to retrieve audio content for playback from an audio source that is accessible via a communication path that includes the secure WLAN, and wherein the non-transitory computer-readable medium is also provisioned with program instructions that are executable to cause the playback device to perform functions comprising: in response to receiving the command, retrieving the audio content from the audio source via the communication path that includes the secure WLAN.**

183. This claim is substantively identical to claim 11. Accordingly, Rector discloses, teaches, or suggests this claim for the same reasons discussed above.

R. Independent Claim 20

184. Claim 20 is reproduced below. For ease of discussion, I have included a label for each claim limitation.

[20.P] A method comprising:

[20.a] detecting a triggering event that causes the playback device to enter a setup mode in which the playback device transmits at least a first message indicating that the playback device is available for setup;

[20.b] while in the setup mode, receiving a response to the first message that facilitates establishing an initial communication path with a computing device that is installed with an application for controlling the playback device, wherein the computing device is operating on a secure wireless local area network (WLAN) that is defined by an access point, wherein the initial communication path with the computing device does not traverse the access point;

[20.c] receiving, from the computing device via the initial communication path, at least a second message containing network configuration parameters for the secure WLAN, wherein the network configuration parameters comprise an identifier of the secure WLAN and a security key for the secure WLAN;

[20.d] using the network configuration parameters to connect to the secure WLAN that is defined by the access point; and

[20.e] transitioning from communicating with the computing device via the initial communication path to communicating with the computing device via the secure WLAN that is defined by the access point.

185. The claim limitations in column 1 share substantial similarities with the corresponding claim limitations in column 2. Accordingly, Rector discloses, teaches, or suggests the claim limitations in column 2 for the same reasons as explained for the corresponding limitation in column 1.

<u>Column 1: Claim 1</u>	<u>Column 2: Claim 20</u>
[1.d] program instructions stored on the non-transitory computer-readable medium that, when executed by the at	[20.P] A method comprising:

least one processor, cause the playback device to perform functions comprising:	
[1.e.1] detecting a triggering event that causes the playback device to enter a setup mode in which the playback device transmits at least a first message indicating that the playback device is available for setup;	[20.a] detecting a triggering event that causes the playback device to enter a setup mode in which the playback device transmits at least a first message indicating that the playback device is available for setup;
[1.e.2] while in the setup mode, receiving a response to the first message that facilitates establishing an initial communication path with a computing device that is installed with an application for controlling the playback device, wherein the computing device is operating on a secure wireless local area network (WLAN) that is defined by an access point, wherein the initial communication path with the computing device does not traverse the access point;	[20.b] while in the setup mode, receiving a response to the first message that facilitates establishing an initial communication path with a computing device that is installed with an application for controlling the playback device, wherein the computing device is operating on a secure wireless local area network (WLAN) that is defined by an access point, wherein the initial communication path with the computing device does not traverse the access point;
[1.e.3] receiving, from the computing device via the initial communication path, at least a second message containing network configuration parameters for the secure WLAN, wherein the network configuration parameters comprise an identifier of the secure WLAN and a security key for the secure WLAN;	[20.c] receiving, from the computing device via the initial communication path, at least a second message containing network configuration parameters for the secure WLAN, wherein the network configuration parameters comprise an identifier of the secure WLAN and a security key for the secure WLAN;
[1.e.4] using the network configuration parameters to connect to the secure WLAN that is defined by the access point; and	[20.d] using the network configuration parameters to connect to the secure WLAN that is defined by the access point; and
[1.e.5] transitioning from communicating with the computing device via the initial communication path to communicating with the computing device via the secure WLAN	[20.e] transitioning from communicating with the computing device via the initial communication path to communicating with the computing device via the secure WLAN

that is defined by the access point.	that is defined by the access point.
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X. Ground 3: Rector in view of Richenstein Renders Obvious Claims 3, 7-11, 13, and 19

186. As explained above, Rector discloses devices and methods for adding an audio device to an audio network using a first connection 202 to another device. Rector further discloses that, although not limited to any particular type of connection, “it is desirable for network connection 202 to be an infra-red wireless connection.” EX1004, [0023]. Richenstein discloses audio devices communicating through an exemplary IR connection of transceivers and receivers. EX1005, [0007], [0036], [0043]-[0044],

187. To any extent Rector does not itself disclose, explicitly or inherently, these uses and applications, it is my further opinion that a POSITA would have been motivated to look to the Richenstein (EX1005) for the detailed explanation for how to use the audio network built by Rector. Rector and Richenstein are in the same field of endeavor to provide a network for connecting various devices and create a network of audio devices using IR transmitters and receivers.

188. In my opinion, all the dependent claims challenged under Ground 3 each additionally recite only generic operations of the playback device after setup (“post-setup operations”), unrelated to the setup process itself that the ’883 patent purported invented. These claimed post-setup operations, including controlling

networked audio devices (Claims 3, 9), forming/joining playback groups (Claims 7-8), controlling audio content retrieval from sources (Claims 10-11), and coordinating synchronized playbacks (Claim 13), are all clearly disclosed by Richenstein, in various embodiments. *See generally*, EX1005. In my opinion, a POSITA would have found it obvious to implement any of these post-setup operations disclosed by Richenstein's on an audio device after it is connected to the network using Rector's methods.

189. Rector and Richenstein are analogous art, both in the same field of endeavor as the '883 patent, which relates to audio playback devices on a wireless network. EX1001, 6:36-52; EX1004, [0002]; EX1005, [0003]. Both Rector and Richenstein are pertinent to the purported problem addressed by the '883 patent: connecting audio playback devices to a wireless network for networked audio playback. EX1001, 9:1-20; EX1004, [0021]; EX1005, [000], [0024].

190. Similar to Rector, Richenstein specifically designs its network to be "easily expandable . . . to connect additional devices to the network" through wireless interfaces. EX1005, [0173]. In my opinion, a POSITA would have recognized that the post-setup operations disclosed by Richenstein are designed to accommodate and thus compatible with devices newly connected to its network.

191. A POSITA would also have found it routine, straightforward, and advantageous to apply Richenstein's teachings to the audio device disclosed by

Rector after it joins the network using Rector's setup methods. A POSITA would have known such a combination (yielding the claimed limitations) would provide expected results with a reasonable expectation of success, particularly as the post-setup operations are largely unrelated to the setup process itself, and their implementations do not require substantive modification to Rector's disclosures or Richenstein's disclosures. For example, a POSITA would use Rector's disclosures to setup an audio playback device in Richenstein to connect to the wireless network in Richenstein, and once it is connected to the network, use Richenstein's disclosures for controlling the playback devices for retrieving and playing content, alone or with another, as disclosed by Richenstein. It is straightforward and easy to implement with Rector and Richenstein's step-by-step instructions.

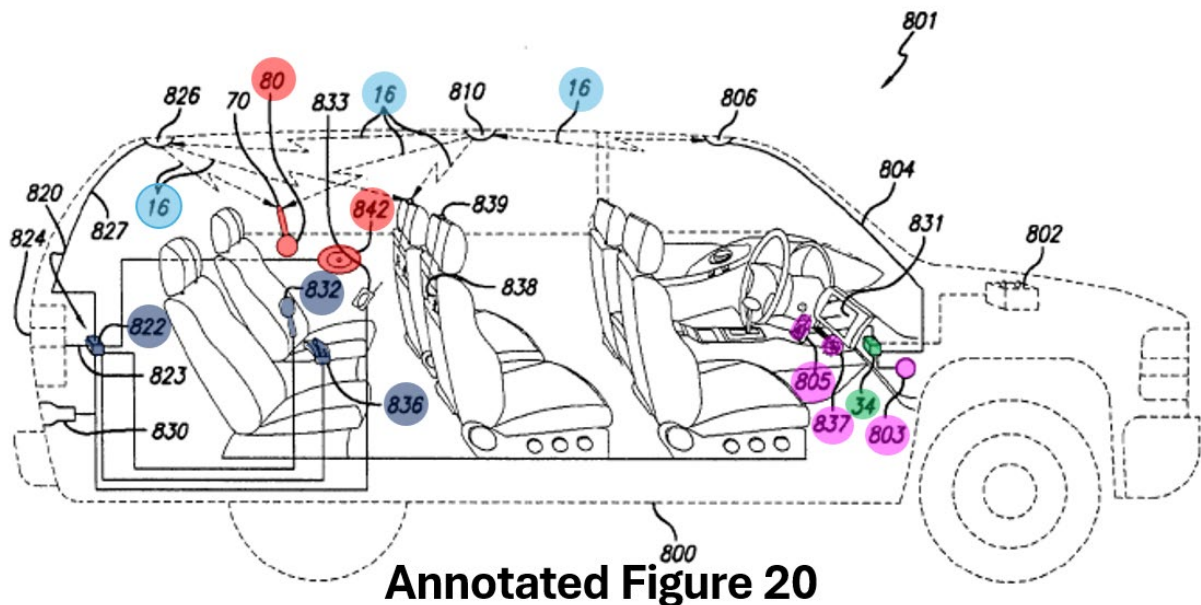
192. For reasons further explained below, it is my opinion that: Rector in view of Richenstein renders claims 3, 7-11, 13, and 19 of the '883 Patent obvious.

A. Dependent Claim 3: The playback device of claim 1, wherein the computing device comprises a controller device of a networked audio system.

193. Rector in view of Richenstein renders obvious *the playback device of claim 1, wherein the computing device comprises a controller device of a networked audio system*. As discussed above, a POSITA would have understood, or at least found it obvious, that Rector discloses proximity setup component 108 ("*controller device*") of a *networked audio system* collectively formed by 108 and network device

112 (an audio “*playback device*”). EX1004, [0021], [0026].

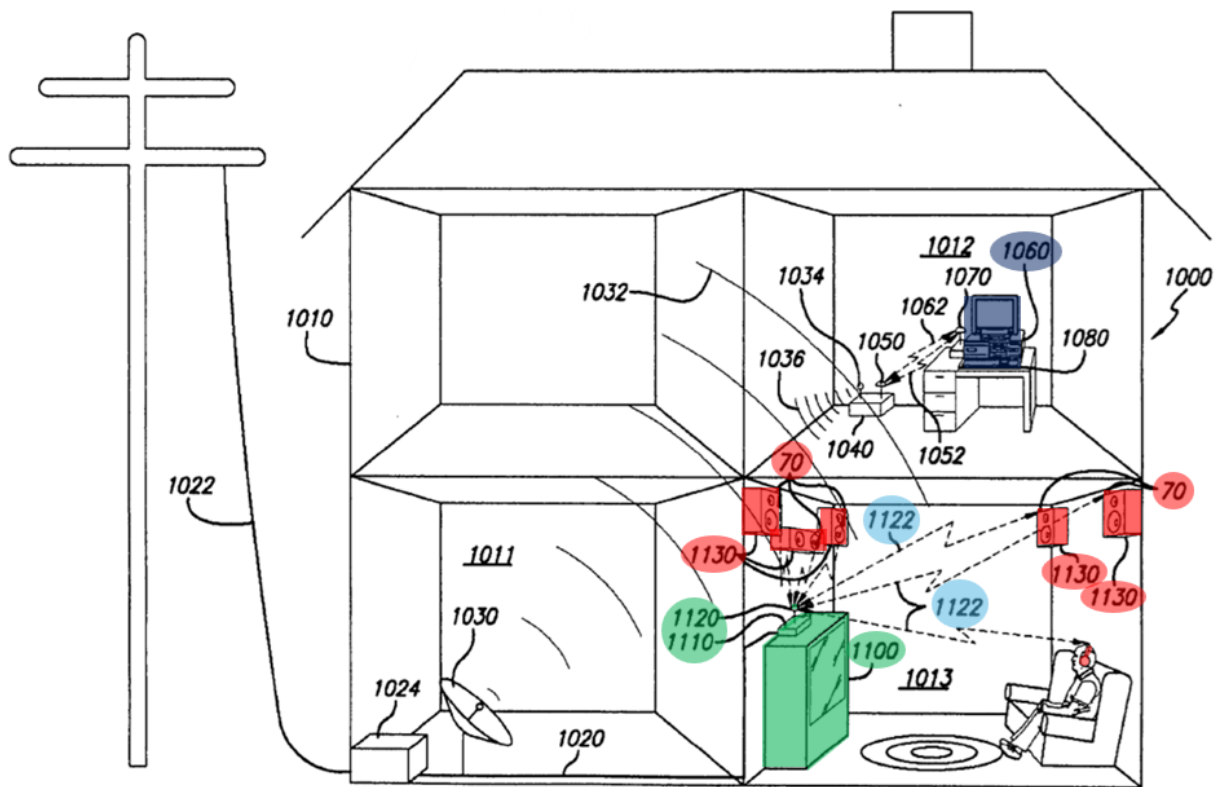
194. To the extent further explicit teaching is required, Richenstein discloses a game controller device 836 (“*controller device*”) connected to various digital audio players via a wireless network (“*networked audio system*”). EX1005, [0166], FIGs. 1, 19, 20 (annotated below). Game controller device 836 can take the form of, e.g., “a joystick, touch pad, mouse, etc.” EX1005, [0152]. Richenstein specifically discloses game controller device 836/936 can be used to control media playback, “e.g., pause, stop, fast forward” and “control trunk mounted cd changer” on the network. EX1005, [0166].



EX1005, FIG. 20 (Annotated)

195. Richenstein further discloses a computer 1060 (“*controller device*”) that controls media playback, e.g., to select channel or cable network content to be

played by audio devices on a wireless network (“*networked audio system*”). EX1005, [0174], Fig. 23 (annotated below).



Annotated Figure 23

EX1005, FIG. 23 (Annotated)

196. Rector discloses that proximity setting component 108 can be a computer and it is connected to network device 112, an audio playback device, over wireless network 120. EX1004, [0021]. A POSITA would have found it routine, straightforward, and advantageous to use Rector's component 108, a computer, to implement the audio system control functions expressly disclosed by Richenstein, such as using controller device 836/936 and/or computer 1060, to control the

networked audio devices disclosed in Rector in a similar way. A POSITA would also have found it routine, straightforward, and advantageous for reasons I explained above in this section. A POSITA would have known that such an application (yielding the claimed limitations) would predictably work and provide the expected results.

197. Thus it is my opinion that a POSITA would have found claim 3 to be rendered obvious by Rector in view of Richenstein.

- B. Dependent Claims 7 and 8: The playback device of claim 1, further comprising program instructions stored on the non-transitory computer-readable medium that, when executed by the at least one processor, cause the playback device to perform functions comprising: ‘after connecting to the secure WLAN, establishing a new networked audio system on the secure WLAN’ and ‘after connecting to the secure WLAN, joining an existing networked audio system operating on the secure WLAN.’**

198. Rector in view of Richenstein renders obvious *the playback device of claim 1, further comprising program instructions stored on the non-transitory computer-readable medium that, when executed by the at least one processor, cause the playback device to perform each of after connecting to the secure WLAN, establishing a new networked audio system on the secure WLAN’ and ‘after connecting to the secure WLAN, joining an existing networked audio system operating on the secure WLAN’*. As discussed above, a POSITA would have understood, or at least found it obvious, that Rector discloses or otherwise renders

obvious for newly connected network device 112 to “*form a new networked audio system*” with other networked device or “*join an existing networked audio system*” if previously connected audio device already forms such a system. EX1004, [0003], [0021], [0016].

199. Further, Richenstein explicitly discloses that after connecting to the network, audio devices, like the exemplary headset 14 (shown as headphones 80 in the in-vehicle audio system of Fig. 20 and headsets 14 in the home entertainment audio system in Fig. 23) can establish a “synchronization” group with other devices on the network (“*join an existing networked audio system*”). EX1005, [0066]. Richenstein further discloses that headsets 14 might be “replaced or moved between” different synchronization groups (“*join an existing networked audio system*”). EX1005, [0066]. Richenstein further discloses adding new devices to audio networks, explaining that “each new device can be equipped with an IR transmitter/receiver that allows the device to connect to the network through one of the wireless interfaces.” EX1005, [0175]. A POSITA reading Richenstein would have found it routine, straightforward, and advantageous to apply Richenstein’s teachings to the Rector-disclosed audio device after it joins the network. It would also have been obvious to a POSITA that when the audio device joins a network to playback content on the network, it will either establish a new networked audio system or to join an existing one, to maintain synchronization operations between

multiple playback devices, as taught by Richenstein. EX1005, [0066] (“one important task . . . is to maintain synchronization between the operations.”). A POSITA would be motivated to do so to improve the user experience of seamlessly enjoying audio selections throughout a building or in a vehicle through multiple speakers, and indeed, Richenstein itself provides teaching, suggestions, or motivation that would have led a POSITA to do so with a “highly flexible” design. EX1005, [0177]-[0178]. A POSITA would also have found it routine, straightforward, and advantageous for reasons I explained above in this section. A POSITA would have known such a combination (yielding the claimed limitations) would provide expected results with reasonable expectation of success because each device would be used in the manner it was designed to be used and to achieve the purposes it was intended to achieve.

200. Thus, it is my opinion that a POSITA would have been motivated to combine Rector and Richenstein in the claimed manner, which renders obvious claims 7 and 8 of the ’883 patent.

- C. Dependent Claim 9: The playback device of claim 1, further comprising program instructions stored on the non-transitory computer-readable medium that, when executed by the at least one processor, cause the playback device to perform functions comprising receiving, from the computing device, a command to assign a name to the playback device.**

201. Rector in view of Richenstein renders obvious *receiving, from the*

computing device, a command to assign a name to the playback device. Rector discloses network device 112 is configured to join network 120. Device 112 inherently has its identification. Richenstein explicitly discloses that each audio device “may be provided with a means of individual identification, which may be entered by the user via the controls.” EX1005, [0169]. Richenstein explains the use of such identification for individual configurations and settings according to the user’s preferences. As Richenstein describes, such individual identification would allow for unique settings that are specific to the individual device, enabling the user to customize the playback for the abilities and role that individual device plays in the audio network as a whole.

The individual identification will allow the audio device to embed the custom settings for every set of headphones in the data stream representing each channel to be recovered by each set of headphones, following which each set of headphones will identify and select its own appropriate set of custom settings to apply to the signal of the channel selected by the user of the particular set of headphones.⁴¹

202. Accordingly, it is my opinion that a POSITA would have been motivated to combine Rector and Richenstein in this manner.

203. A POSITA reading Richenstein would have further found it routine, straightforward, and advantageous to assign a name, as taught by Richenstein, to the Rector-disclosed audio device after it joins the network, and for reasons I explained

⁴¹ EX1005, [0169]

above in this section. Each device is used according to its ordinary use, and in fact, the individual identifier would further allow for the individual devices to be used with greater accordance to their own unique and ordinary capabilities. A POSITA would have known such a combination (yielding the claimed limitations) would provide expected results with reasonable expectation of success because each device would be used in the manner it was designed to be used and to achieve the purposes it was intended to achieve.

204. Thus, it is my further opinion that a POSITA would have found claim 9 obvious in view of Rector and Richenstein.

D. Dependent Claim 10: The playback device of claim 1, wherein communicating with the computing device via the secure WLAN comprises receiving a command related to playback of audio content.

205. Rector in view of Richenstein renders obvious *the playback device of claim 1, wherein communicating with the computing device via the secure WLAN comprises receiving a command related to playback of audio content.*

206. Specifically, Rector discloses network device 112 “receives data over a network and plays the audio data through loudspeakers” and a POSITA would have understood that, in order for the audio device to properly playback the audio data, such data necessarily includes “*a command related to playback of audio content.*” EX1004, [0021], [0016]. The ability to control playback would be an

necessity for an audio network, and given the role of network device 112 in network 120, a POSITA would have understood it to receive commands relating to audio playback.

207. To the extent further explicit teaching is required beyond Rector's disclosures, Richenstein specifically discloses the controller devices may send commands to audio device 34 or home theatre 1100 for playback ("*command related to playback of audio content*"), which includes commands for the device to access and retrieve audio content from audio sources like cellular device 805 or cable network 1022 ("*command to retrieve audio content for playback from an audio source*"). EX1005, [0165]-[0166]; [0174]. Therefore, both Rector and Richenstein explicitly discloses a common goal: to enable audio playback devices to receive and play content from sources accessible over a network. In light of such teaching, suggestion, and motivation, it is my opinion that a POSITA would have found sufficient teaching, suggestion, and motivation to apply Richenstein's specific teaching of the commands in controlling Rector's audio device to "receive audio files from a source in the network and play them through a loudspeaker." EX1004, [0002]; EX1005, [0003].

208. Thus, it is my further opinion that a POSITA would have found claim 10 obvious in view of Rector and Richenstein.

- E. Dependent Claim 11: The playback device of claim 10, wherein the command comprises a command to retrieve audio content for playback from an audio source that is accessible via a communication path that includes the secure WLAN, and wherein the playback device further comprises program instructions stored on the non-transitory computer-readable medium that, when executed by the at least one processor, cause the playback device to perform functions comprising: in response to receiving the command, retrieving the audio content from the audio source via the communication path that includes the secure WLAN**

209. Rector in view of Richenstein renders obvious *the playback device of claim 10, wherein the command comprises a command to retrieve audio content for playback from an audio source that is accessible via a communication path that includes the secure WLAN, and wherein the playback device further comprises program instructions stored on the non-transitory computer-readable medium that, when executed by the at least one processor, cause the playback device to perform functions comprising: in response to receiving the command, retrieving the audio content from the audio source via the communication path that includes the secure WLAN.*

210. Rector expressly discloses “audio devices can be connected to the network that receive audio files from a source in the network and play them through a loudspeaker.” EX1004, [0003], [0021]. A POSITA would have understood that for an audio device to receive such audio files, it necessarily has to receive a command instructing it to retrieve them and then it goes to retrieve in response to

that command.

211. To the extent further explicit teaching is required beyond Rector's disclosures, Richenstein specifically discloses the controller devices may send commands to audio device 34 or home theatre 1100 for playback ("*command related to playback of audio content*"), which includes commands for the device to access and retrieve audio content from audio sources like cellular device 805 or cable network 1022 ("*command to retrieve audio content for playback from an audio source*"). EX1005, [0165]-[0166]; [0174]. Therefore, both Rector and Richenstein explicitly disclose a common goal: to enable audio playback devices to receive and play content from sources accessible over a network. In light of such teaching, suggestion, and motivation, it is my opinion that a POSITA would have found sufficient teaching, suggestion, and motivation to apply Richenstein's specific teaching of the commands in controlling Rector's audio device to "receive audio files from a source in the network and play them through a loudspeaker." EX1004, [0002]; EX1005, [0003].

212. Thus, it is my further opinion that a POSITA would have found claim 11 obvious in view of Rector and Richenstein.

- F. Dependent Claim 13: The playback device of claim 1, after transitioning to communicating with computing device via the secure WLAN, receiving, from the computing device, a command to form a group with at least a first playback device of a networked audio system such that the playback device is configured to play back audio content in synchrony with at least the first playback device.**

213. Rector in view of Richenstein renders obvious *after transitioning to communicating with computing device via the secure WLAN, receiving, from the computing device, a command to form a group with at least a first playback device of a networked audio system such that the playback device is configured to play back audio content in synchrony with at least the first playback device.*

214. Rector discloses after network device 112 transitions to communication over network 120, it receives a command to play back audio content received from other networked devices on network 120 and it becomes a part of a networked audio system. EX1004, [0003], [0021], [0016].

215. Similarly, Richenstein even provides remote controllers 936 may be used to control make commands to play, pause, stop, fast forward, etc. EX1005, [0166]. Richenstein further discloses how important it is to form a synchronization group of playback devices and maintain synchronization playback operations between them and discloses detailed synchronization methods to achieve that goal. EX1005, [0066] (“one important task . . . is to maintain synchronization between the operations”), [0053]-[0061]. The in-vehicle and home systems described by

Richenstein are both exemplary audio systems where synchronous playback between devices are crucial for user experience. EX1005, Figs. 20 and 23.

216. Richenstein further explains how playing back audio on multiple speakers without doing so with appropriate synchronization measures in place degrades the quality of audio. EX1005, [0068]. A POSITA would recognize that when playing back audio for the car, it would be expected for there to be a speaker at the front of the car attached to or as part of audio device 34. Accordingly, when more than one person in the car is participating on a phone call or otherwise listening to the same media, it would be beneficial for audio device 34, including its speaker, to play the audio in synchrony. Further, in Fig. 23, home theatre system 1100 and speakers 1030 are part of a home theatre. As a result, it would be expected that the devices would play back the selected media in synchrony using the synchronization methods.

217. A POSITA would have been motivated to apply Richenstein's teachings towards synchrony in order to avoid the degradation of quality in playback described by Richenstein, and to implement the play commands described by both Rector and Richenstein. Doing so would have been achievable using each device for its intended purpose and with a reasonable expectation of success due to the ordinary functions and purposes each device and capability is being applied for.

218. Under the explicit teaching, suggestion, and motivation by Richenstein

to form a group and maintain synchronization between playback devices, a POSITA would be motivated and found it advantageous to do so on Rector's audio device after it joins the network for audio playback.

219. Thus, it is my opinion that Rector in view of Richenstein renders obvious claim 13.

G. Dependent Claim 19: The non-transitory, computer-readable storage medium of claim 14, wherein communicating with the computing device via the secure WLAN comprises receiving a command to retrieve audio content for playback from an audio source that is accessible via a communication path that includes the secure WLAN, and wherein the non-transitory computer-readable medium is also provisioned with program instructions that are executable to cause the playback device to perform functions comprising: in response to receiving the command, retrieving the audio content from the audio source via the communication path that includes the secure WLAN.

220. This claim is substantively identical to claim 11. Accordingly, Rector in view of Richenstein renders this claim obvious for the same reasons discussed above with respect to claim 11.

XI. Ground 4-5: Gassho Anticipates or Otherwise Renders Obvious Claims 1-8, 12, and 14-20.

A. Independent Claim 1

221. Claim 1 is reproduced below. For ease of discussion, I have included a label for each claim limitation.

[1.P] A playback device comprising:

[1.a] a network interface that is configured to provide an interconnection with at least one data network;

[1.b] at least one processor;

[1.c] a non-transitory computer-readable medium; and

[1.d] program instructions stored on the non-transitory computer-readable medium that, when executed by the at least one processor, cause the playback device to perform functions comprising:

[1.e.1] detecting a triggering event that causes the playback device to enter a setup mode in which the playback device transmits at least a first message indicating that the playback device is available for setup;

[1.e.2] while in the setup mode, receiving a response to the first message that facilitates establishing an initial communication path with a computing device that is installed with an application for controlling the playback device, wherein the computing device is operating on a secure wireless local area network (WLAN) that is defined by an access point, wherein the initial communication path with the computing device does not traverse the access point;

[1.e.3] receiving, from the computing device via the initial communication path, at least a second message containing network configuration parameters for the secure WLAN, wherein the network configuration parameters comprise an identifier of the secure WLAN and a security key for the secure WLAN;

[1.e.4] using the network configuration parameters to connect to the secure WLAN that is defined by the access point; and

[1.e.5] transitioning from communicating with the computing device via the initial communication path to communicating with the computing device via the secure WLAN that is defined by the access point.

1. [1.P] A playback device comprising

222. To the extent the preamble is deemed limiting, Gassho discloses [1.p] by disclosing a “wireless communication device” that can be, among other, a “cell phone,” which a POSITA would have recognized as an audio “*playback device*.” EX1006, [0073]. At the time, cell phones were able to produce audio and playback media whether directly through its own speakers or connected to headphones. A POSITA would have known that cell phones at the time of the invention had audio playback functions, such as basic MP3 music playing functions and certainly voice messages playbacks.

223. Even if the Board find Gassho’s disclosure insufficient, a POSITA would have found it obvious to implement Gassho’s techniques on an audio playback device. Specifically, Gassho’s invention is disclosed to be used to set up “wireless communication devices.” EX1004, [0005], [0075]. Gassho further discloses that when such devices have insufficient user interface, they may receive information vis radio transmission.

Some wireless communication devices, for example, a print Server or an access point, may not have an interface to implement the settings. In Such cases, the information is transmitted by radio from another wireless

communication device to the wireless communication device without the interface for settings.⁴²

224. A POSITA would be aware that devices lack user interfaces for many reasons including size, design costs, materials choices, and even aesthetic considerations. For example, a POSITA would appreciate that a device like headphones would be fairly small and could not include, for example, a full keyboard for typing in security information or an LCD screen for displaying current settings. For such a wireless communication device, a POSITA would have found it obvious in light of Gassho's teachings that the device could be configured using the methods described in Gassho despite the limited user interface available on the headphones.

225. Rector provides evidence of this exact scenario and motivation in the field. As explained, cost and device purpose can limit user interfaces for audio devices and that individuals in the field, leading individuals to implement the disclosed method of Gassho.

For some network computing devices, a user interface exists allowing a user to enter the correct parameters when adding the device. However, for many of the low-cost, special purpose devices such as the network audio device described above, the user interface is non-existent or difficult to use. In order to remedy this problem, some systems have provided a mechanism in which the required communications parameters are sent over the network from a previously configured device to the device to be added.⁴³

⁴² EX1006, [0005].

⁴³ EX1004, [0005].

226. A POSITA would also have found it routine, straightforward, and advantageous to do so, as Gassho's setup process does not differ for different types of "wireless communication device" that needs set up, as expressly acknowledged by Gassho itself.

The technique of the present invention is not restricted to the wireless communication based on the standard IEEE 802.11b, but is applicable to settings between various wireless communication devices including cordless phones, cell phones, and walkie-talkies.⁴⁴

227. Therefore, it would have been routine for a POSITA to implement Gassho's invention for an audio device by applying the known technique for general wireless devices with limited user interface to the specific example of a playback device without significant variation or obstacle in doing so. Accordingly, a POSITA would have also expected that this technique would be successful in achieving the stated goals and applications described in Gassho itself. Such basic playback device designs were known and well understood in the art.⁴⁵ Accordingly, it is my opinion that a POSITA would have been motivated to make any minor modifications necessary to apply Gassho's methods to any wireless device with limited user interface, including a playback device.

228. Thus, it is my further opinion that a POSITA would have understood

⁴⁴ EX1006, [0075].

⁴⁵ *E.g.*, EX1016.

Gassho to disclose or suggest this element.

2. [1.a] a network interface that is configured to provide an interconnection with at least one data network;

229. Gassho discloses [1.a] by disclosing that the wireless communication device includes a “wireless communication card MC” (“*network interface*”) to provide connection with wireless networks such as those under IEEE 802.11b standards (“*data network*”). EX1004, [0021].

3. [1.b] at least one processor; [1.c] a non-transitory computer-readable medium; and [1.d] program instructions stored on the non-transitory computer-readable medium that, when executed by the at least one processor, cause the playback device to perform functions comprising:

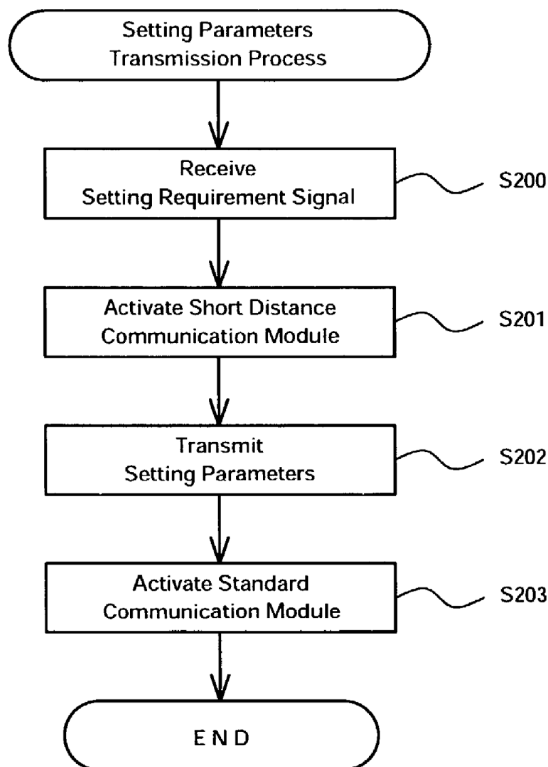
230. Gassho discloses [1.b], [1.c], and [1.d] by disclosing that the wireless communication device includes a CPU (“*processor*”), “a diversity of recording media, such as a flexible disk, a CD-ROM, a DVD, an MO, an IC card, a ROM cartridge, or a hard disk” (“*a non-transitory computer readable medium*”) and programs recorded on the recording medium “that causes the computer to attain the functions” (“*program instructions*”). EX1006, [0020], [0040]. Gassho discloses various embodiments for the wireless communication device, including ST, PS, cell phone, etc., all of which a POSITA would have understood to have all these features recited in [1.b]-[1.d].

4. [1.e.1] detecting a triggering event that causes the playback device to enter a setup mode in which the playback device transmits at least a first message indicating that the playback device is available for setup;

231. Gassho discloses [1.e.1] by disclosing that the wireless communication device is triggered by an event (“*triggering event*”) to enter a setup mode in which the device transmits a “setting requirement signal” (“*first message*”) to request setting parameters (“*available for setup*”). EX1006, [0054]-[0055], [0065].

232. Gassho discloses that a radio print server (PS) for setup is “in an initial factory state,” and ST1 needs to be set to the initial settings of the PS to “enable direct communication between the station ST1 and the radio print server PS.” EX1006, [0054]-[0055]. As to how these initial settings are received by ST1, Gassho discloses that the user can obtain them from an instruction manual (in connection with the first embodiment), or the wireless communication device sends a “setting requirement signal” that includes the device’s own factory setting parameters (in connection with the second embodiment). EX1006, [0065], FIG. 6 (step S200). This setting requirement signal is a “request signal that requires the setting parameters,” thus indicating that the wireless communication device is available for setup and thus constitutes the “*first message*.” To the extent the disclosures are made in two embodiments, Gassho suggests the features of the two embodiments are compatible and a POSITA would understand that Gassho discloses

that the “setting requirement signal” can also be implemented within the first embodiment instead of the instruction manual, or at least would have found it obvious to modify the first embodiment to do so. EX1006, [0061], [0066], [0068], [0074]-[0075].



EX1006, FIG. 6

233. Gassho’s use of “setting requirement signal” is a standard way for IP broadcasting. In my opinion, it is the same technique that the ’883 patent calls “standard IP broadcast,” which it designs its probing messaging in compliant with EX1001, 2:30-33. To the extent Gassho does not explicitly disclose a triggering event, a POSITA would have understood that the device needs to be triggered by a

certain event to be in a setup mode to send the “setting requirement signal,” and thus a triggering event is inherent to Gassho. For example, consistent with the IP broadcast standard, the disclosed “beacon” is sent after the device is power-on or reset (“*triggering event*”). This is in fact how the wireless print server EpsonNet 802.11b offered by Gassho’s assignee, Seiko Epson Corp., actually triggers the device to be in setup mode in a setup process consistent with the disclosures of Gassho. EX1039 (EpsonNet user guide), 8, 10, 16 (“holding down the print server’s test button for five seconds to reset it”). Furthermore, a POSITA would have found a triggering event that causes PS to send the “setting requirement signal” is at least obvious because doing so provides more certain on when a device can be set up to connect to the network.

4. [1.e.2] while in the setup mode, receiving a response to the first message that facilitates establishing an initial communication path with a computing device that is installed with an application for controlling the playback device, wherein the computing device is operating on a secure wireless local area network (WLAN) that is defined by an access point, wherein the initial communication path with the computing device does not traverse the access point;

234. Gassho discloses [1.e.2] by disclosing that the wireless communication device receives a response to the “setting requirement signal” (“*first message*”), which facilitates establishing a direct connection using short distance communication (“*initial communication path*”) with wireless equipment setting device (“*computing device*”) that has programs running thereon to control the

wireless communication device (“*application for controlling the playback device*”).
EX1006, [0054]-[0055], [0065], [0070].

235. Gassho discloses that the “setting requirement signal” may be “a beacon or any other signal that . . . includes setting parameters” of the other device to be set up. EX1006, [0065]. For example, these initial setting parameters include the factory setting ESS-ID and communication channel of the PS, which ST1 adopts to “enable direct communication between the station ST1 and the radio print server PS” (“*response to first message*”). EX1006, [0054], [0055]. This initial exchange facilitates wireless equipment setting device to activate short distance communication over the direct connection (“*establishing the initial communication path*”) to transmit setting parameters. EX1006, [0055], [0065], [0070]. It is commonly known in the art that an IP broadcast message, such as a beacon, requires the recipient to respond before a connection is made between the sender and the recipient. EX1011, 36 (802.11 requiring “mutually acceptable, successful, authentication”), 75 (“A mutual authentication relationship shall exist between two stations following a successful authentication exchange...”). A POSITA would understand the mutually successful authentication to require confirmations to both devices of receipt and implementation of configurations.

236. Indeed, Gassho’s use of its setting requirement signal and response would have been well-known to a POSITA at the time of the invention and is

consistent with the same technique acknowledged by the '883 patent itself as “probing datagrams in compliance with the standard IP broadcast,” as well as implemented by Spurgat. EX1001, 2:30-35, 16:31-51; EX1007, [0093], [0107]. Therefore, a POSITA would have understood that both layer 2 and layer 3 broadcast messages are a well-known discovery mechanism and a response to the broadcast beacon is utilized by the standard for the disclosed “direct connection” to be initialized and established, and therefore inherent to Gassho. An alternative reading of the response I found in Gassho is that Gassho discloses “the user clicks the ‘Set’ button to give the setting instruction,” in response to which “station ST1 activates the short distance communication.” Gassho, [0055]. What the station ST1 sends following the user’s click of the “Set” button is a response that facilitates the establishment of the short distance communication.

237. To the extent the Board does not find the disclosure inherent in light of Gassho and the communication standard, a POSITA would have found it obvious to transmit a response to the device that sends the “setting requirement signal” before establishing the direct connection, because doing so would provide the receiving device with information of the device that detects it and will establish a direct connection with it, to further improve security in transmitting the setting parameters. EX1006, [0006] (describing the importance to “keep the setting information in secrecy” while transmitting over the direct connection), [0057]. A POSITA would

also have found it routine and straightforward to implement such a response, which yields a predictable result. Other devices in the area would either have to be in range of the short-range RF signal or be in line of sight of the infrared signal. Either of these requirements would reduce the probability of interception and increases the security of the system.

238. Gassho further discloses [1.e.2] by disclosing that the wireless equipment setting device, e.g., ST1 (“*computing device*”) is operating on a wireless network group X (“*a secure wireless local area network (WLAN)*”) that is defined by AP1 (“*an access point*”), and that direct connection using short distance communication (“*the initial communication path*”) with ST1 (“*computing device*”) does not traverse AP1 (“*the access point*”). EX1006, [0040], [0044], [0054]-[0055].

239. For example, Gassho discloses station ST includes a personal computer PC (“*computing device*”), which has “several functions for settings in a wireless communication device,” and “[t]hese functions are actualized by installation of a utility software program” (“*application for controlling the playback device*”). EX1006, [0040], [0044]. ST also sends print data to PS and controls PS to print. EX1006, [0054]. Gassho further discloses that the “wireless network group X is constructed by an access point AP1 and stations ST1 and ST2” and works under a specific setting. EX1006, [0054]. Gassho therefore discloses ST1 is operating on the wireless network group X (“*WLAN*”). EX1006, [0054]. Gassho also discloses

that the short distance communication path (“*the initial communication path*”) is a “direct communication” between ST1 and PS, and thus “*does not traverse the access point*” AP1. EX1006, [0055].

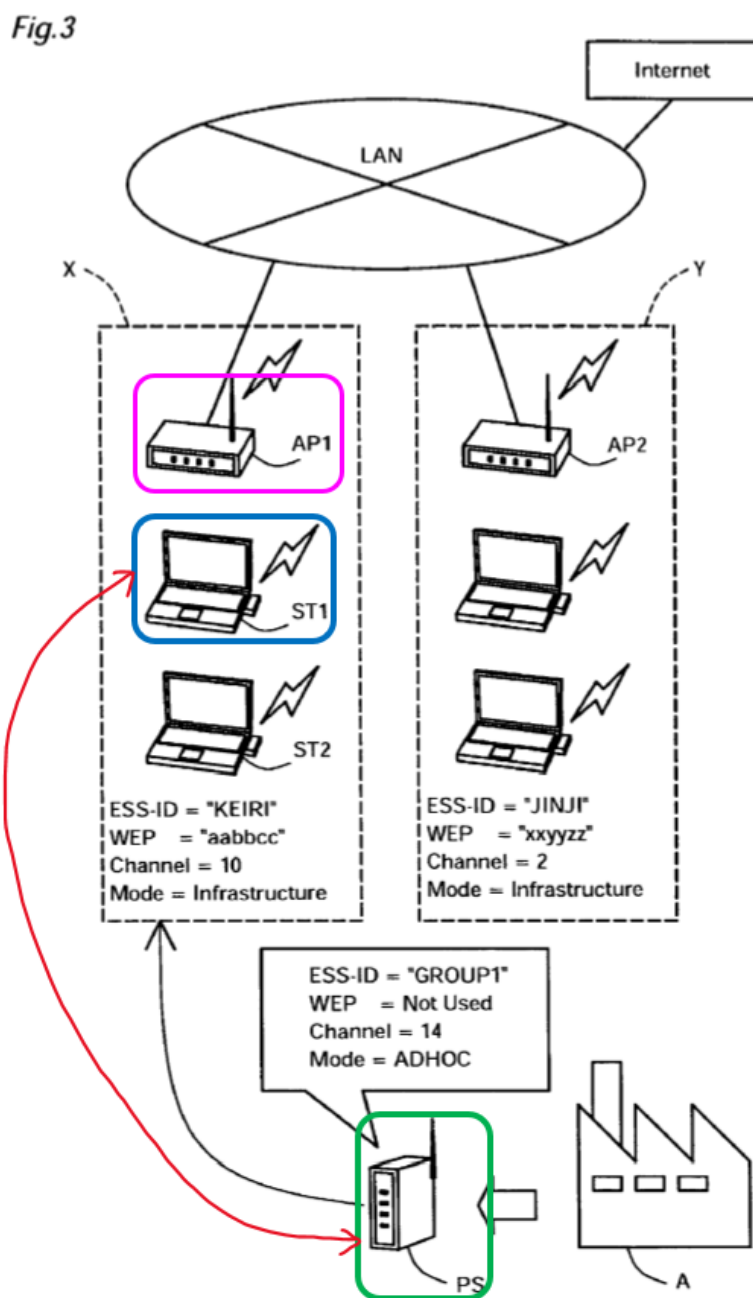
240. Therefore, a POSITA would have understood that Gassho discloses, explicitly or inherently, or at least renders obvious element [1.e.2].

5. [1.e.3] receiving, from the computing device via the initial communication path, at least a second message containing network configuration parameters for the secure WLAN, wherein the network configuration parameters comprise an identifier of the secure WLAN and a security key for the secure WLAN;

241. Gassho discloses [1.e.3] by disclosing that the wireless communication device, e.g., PS (“*playback device*”) receives from the wireless equipment setting device, e.g., ST1 (“*computing device*”) via the direction connection using short distance communication (“*initial communication path*”) the setting parameters of network group X (“*at least a second message containing network configuration parameters for the secure WLAN*”), and these network configuration parameters include ESS-ID (“*an identifier of the secure WLAN*”) and the WEP key (“*a security key for the secure WLAN*”). EX1006, [0045], [0054]-[0055].

242. In connection with FIG. 3 and FIG. 4, Gassho explicitly discloses that “station ST1 activates the short distance communication module 11 . . . and transmits the input setting parameters to the radio print server PS (step S103).” EX1006, [0055], FIG. 4. The “setting parameters” include those required to connect to

wireless network group X (“the secure WLAN”), including, e.g., ESS-ID “for identifying a wireless network group” and WEP representing “key information used for encoding and decoding data transmitted and received.” EX1006, [0045], [0054].



EX1006, FIG. 3 (Annotated)

6. [1.e.4] using the network configuration parameters to connect to the secure WLAN that is defined by the access point; and

243. Gassho discloses [1.e.4] by disclosing that the wireless communication device, e.g., PS uses the setting parameters it received from ST1 to connect to wireless network X (“*the secure WLAN*”) that is defined by AP1 (“*access point*”). EX1006, [0056]. Gassho expressly discloses that “the radio print server PS receives the setting parameters by radio and carries out setting required for communication” on wireless network X. EX1006, [0057].

7. [1.e.5] transitioning from communicating with the computing device via the initial communication path to communicating with the computing device via the secure WLAN that is defined by the access point.

244. Gassho discloses [1.e.5] by disclosing that the wireless communication device, e.g., PS, switches from communicating with ST1 via short distance communication (“*initial communication path*”) to standard communication over wireless network group X (“*the secure WLAN*”) that is defined by AP1 (“*access point*”). EX1006, [0056]. Gassho discloses that during the course of direct communication with PS, ST1 temporarily keeps its original setting for wireless network group X aside. EX1006, [0058]. Gassho discloses that after sending the setting parameters, ST1 “inactivates the [short] distance communication module 11 and activates the standard communication module 10 (step 104)” to communicate with PS, such that “[t]he radio print server PS receives print data from stations ST

via wireless communication and causes a printer connected via a cable to print the input print data.” EX1006, [0054], [0056]. That indicates ST1 stops communication with PS via the direct connection after it is set up, and returns to communicate with PS over wireless network group X using the originally settings. EX1006, [0056], [0058]. A POSITA would have understood that as a transition of communication as recited in element [1.e.5]. From the foregoing, Gassho anticipates or otherwise renders obvious claim 1.

B. Dependent Claim 2: The playback device of claim 1, wherein the triggering event comprises one of (a) powering on the playback device or (b) receiving user input via a physical interface of the playback device.

245. Gassho further discloses or otherwise renders obvious additional features recited by Claim 2. As discussed for [1.e.1], A POSITA would have understood that Gassho discloses, or at least found it obvious, that powering on (*“powering on the playback device”*) and/or resetting the wireless communication device (*“user input via a physical interface of the playback device”*) constitute the *“triggering event.”* EX1039 (EpsonNet user guide).

C. Dependent Claim 3: The playback device of claim 1, wherein the computing device comprises a controller device of a networked audio system.

246. Gassho further discloses or otherwise renders obvious Claim 3. Gassho discloses that “station ST used for settings in an external wireless communication

device” includes “a personal computer PC,” and “[t]he radio print server PS receives print data from stations ST via wireless communication and causes a printer connected via a cable to print the input print data.” EX1006, [0040], [0054]. As discussed for [1.p], Gassho discloses an audio device—a cell phone—as another embodiment of its “wireless communication device,” which ST can similarly set up and control for audio playback. EX1006, [0075]. Therefore, a POSITA would have understood that Gassho discloses ST as a controller device of an audio device, and the two devices are connected over a network to form a “*networked audio system*.”

247. To the extent the “*networked audio system*” is interpreted to include more than one audio devices, a POSITA thus would have found it obvious that multiple audio devices can be setup, by repeating the Gassho-disclosed setup process, and form a “*networked audio system*” controlled by ST.

D. Dependent Claim 4: The playback device of claim 1, further comprising program instructions stored on the non-transitory computer-readable medium that, when executed by the at least one processor, cause the playback device to perform functions comprising after receiving the second message, providing an indication that the playback device has successfully received the network configuration parameters for the secure WLAN.

248. Gassho further discloses the additional features recited by Claim 4. Specifically, Gassho expressly discloses that “[t]he station ST1 stops the transmission of the setting parameters, in response to input of a response message that is sent from the radio print server PS and represents that the setting parameters

have been received,” which is precisely what is claimed, “*providing an indication that the playback device has successfully received the network configuration parameters for the secure WLAN.*” EX1006, [0056].

- E. Dependent Claim 5: The playback device of claim 4, wherein providing the indication comprises transmitting, to the computing device via the initial communication path, at least a third message indicating that the playback device has successfully received the network configuration parameters.**

249. Gassho further discloses or otherwise renders obvious the additional features recited in Claim 5, which depends from Claim 4. Gassho expressly discloses that the indication that “the setting parameters have been received” is in the form of “a response message” and it is “sent from the radio print server PS” to ST1. EX1006, [0056]. At the time, ST1 and PS are still directly connected using short distance communication, and thus a POSITA would understand that Gassho discloses the response message is sent through that connection (“*via the initial communication path*”).

- F. Dependent Claim 6: The playback device of claim 4, wherein providing the indication comprises providing an indication that the playback device has successfully connected to the secure WLAN using the network configuration parameters.**

250. Gassho further discloses or otherwise renders obvious the additional features recited in Claim 6, which depends from Claim 4.

251. Specifically, Gassho expressly discloses that “the radio print server PS

receives the setting parameters by radio and carries out setting required for communication.” EX1004, [0021], [0025]. After successfully connecting to the WLAN, “[t]he radio print server PS receives print data from stations ST via wireless communication and causes a printer connected via a cable to print the input print data.” EX1006, [0054], [0056]. A POSITA would have understood any of these actions by PS (connecting to the network, or receiving data over the network) is “*an indication that the playback device has successfully connected to the secure WLAN using the network configuration parameters.*”

252. To the extent the Board does not find the disclosure inherent, a POSITA would have found it obvious to provide such an indication because doing so would allow other devices or the user to understand the connection is successful and therefore ready for use on the network. Such an indication would save power and improve efficiency by removing the need for the transmission to be resent repeatedly to ensure at least one version is received. By instead providing the indication, the device need only make the transmission once, wait for a response, and resend if there is a timeout before such confirmation arrives. Such a mechanism would promote the effective establishment of a connection between devices. EX1006, [0002] (describing the goal is “establishment of communication between wireless communication devices”).

- G. Dependent Claims 7 and 8: The playback device of claim 1, further comprising program instructions stored on the non-transitory computer-readable medium that, when executed by the at least one processor, cause the playback device to perform functions comprising: ‘after connecting to the secure WLAN, establishing a new networked audio system on the secure WLAN’ and ‘after connecting to the secure WLAN, joining an existing networked audio system operating on the secure WLAN.’**

253. Gassho further discloses or otherwise renders obvious features additionally recited by Claim 7 and Claim 8.

254. As discussed for Claim 3, Gassho discloses that after connecting to wireless network group X, ST1 and PS form a new networked printing system to carry out printing tasks. EX1006, [0040], [0054]. And because Gassho discloses the same technique is applicable to an audio device—a cell phone—as another embodiment of its “wireless communication device,” a POSITA would therefore understand that Gassho discloses ST and the audio device can similarly form “*a new networked audio system on the secure WLAN*,” recited by Claim 7.

255. A POSITA would have further understood that Gassho discloses to the extent an audio device is already connected to a network group, it would have formed “*an existing networked audio system operating on the secure WLAN*” as in Claim 7. A POSITA also would have found it obvious to repeat the setting process disclosed by Gassho to set up another new audio device on the network group, which will communicate with other devices, including the existing audio device on the network

group, thus “*join[ing] the existing networked audio system,*” as in Claim 8. A POSITA would have found it obvious to have newly connected device to “*form a new networked audio system*” or “*join an existing networked audio system*” because doing so will allow the audio devices to playback data they receive from other devices over the network, which requires little modification from a skilled artisan and yields predictable result.

H. Dependent Claim 12: The playback device of claim 1, wherein the second message comprises a command for the playback device to adopt the network configuration parameters.

256. Gassho further discloses the features additionally recited by Claim 12.

257. As discussed for [1.e.3], Gassho explicitly discloses that PS receives a “*second message*” that includes the “*network configuration parameters.*” EX1006, [0045], [0054]-[0055]. Gassho emphasizes that “[i]n the wireless LAN, setting information in each wireless communication device is required for establishment of communication.” EX1006, [0004]. Gassho further discloses that “the required parameters may be input as commands.” EX1006, [0046]. Therefore, A POSITA would understand that the second message includes a “*command*” for network device 112 to adopt those received network configuration parameters, as otherwise it will not be able to connect to network 120.

I. Claims 14-18 and 20

258. As described above in grounds 1-2, elements of claims 14 and 20

correspond to elements explained and analyzed in claim 1. Elements of claims 15-18 correspond to elements explained and analyzed in claims 2 and 4-6, respectively. For the same reasons I have set forth above in this Section for grounds 4-5, it is my opinion that Gassho anticipates or renders obvious claims 14-18 and 20.

XII. Ground 6: Spurgat in View of Gassho Renders Obvious Claims 1-20

259. As described above in Sections VIII.D and VIII.C, Spurgat and Gassho each describe connecting devices to a home network. Therefore, they are in the same field of endeavor as the '883 patent, which relates to connecting and controlling wireless communication devices on a local wireless network. (EX1001, 6:36-52; EX1006, abstract, [0008]-[0011]; EX1007, [0003]). They are also pertinent to the purported problem addressed by the '883 patent: securely discovering and configuring devices for communications on a wireless network. (EX1001, 9:1-20; EX1006, abstract, [0008]-[0011]; EX1007, [0007], [0093]).

260. As I explained above, Gassho discloses a setup process recited in claims discussed in Section XI. In particular, as explained above, Gassho discloses a “station ST” (“*computing device*”) that is also “a personal computer PC,” which is “used for settings in an external wireless communication device” (“*playback device*”). (EX1006, [0040], [0054]). Gassho discloses that ST1 is operating on a wireless network group X (“*a secure wireless local area network (WLAN)*”) that is defined by AP1 (“*an access point*”). (EX1006, [0040], [0044], [0054]-[0055]).

Gassho specifically explains that the setup process can be used to connect audio devices including exemplary cordless phones, cell phones, and walkie-talkies. (EX1006, [0075]).

261. Spurgat discloses communications among various digital audio players (e.g., 115, 116, 111, 110, 113, and 112) (“*playback device*”) and computing platform 103 (“*network device*”) on a “local wireless network” (“*a secure wireless local area network (WLAN)*”), using device 104 or 106 as an *access point*, for audio data sharing. (EX1007, [0053]-[0057], FIGs. 1, 3-4). For example, Spurgat discloses computing platform 103 can be a computer and it is “used to control mobile digital audio players 115 and fixed digital audio players 116 by changing the current playlist or the currently playing digital audio content.” EX1005, [0036].

262. Spurgat also discloses an audio player discovery process where Spurgat’s “discovery handler sends a broadcast for players message” and then receives “a message response from the mobile digital audio players,” (similar to the “*first message*” and “*response*” exchange), and finally adds the new device on a list of players among with playlist and content synchronization are performed. (EX1007, [0093], [0107]-[0108], FIGs. 17, 22-23).

263. To the extent Spurgat does not specifically disclose the device setup process, a POSITA would have found it obvious to use Spurgat’s computing platform (“*network device*”), also a computer, to perform the setup functions

performed by Gassho's ST station ("*network device*"), described for any "wireless communication device" ("*playback device*"), to setup Spurgat's digital audio players ("*playback device*") to connect to Spurgat's "local wireless network" ("*a secure wireless local area network (WLAN) defined by an access point*").

264. Spurgat discloses the importance of device discovery and setup, e.g., "Discovery of mobile digital audio players 115 and fixed digital audio players 116 within range of the audio gateway, on the wireless network or wireless communication platform 104, is an important capability with respect to this invention." (EX1007, [0093], [0107]-[0108], FIGs. 17, 22-23). Spurgat also discloses that at the end of its device discovery, the handler "adds the player to the list of players in proximity" for playlist continuation and content synchronization. *Id.* A POSITA would therefore have found explicit teaching, suggestion, and motivation from Spurgat itself to securely discovery and setup a new device, using Gassho's secure setup methods. device discovery and setup.

265. A POSITA would have recognized that Spurgat's audio devices may not have robust user interfaces for entering cumbersome configuration parameters as may be needed to connect them to a secured WEP. As a result, a POSITA would have been motivated to look towards Gassho for a means of connecting the devices to the secure network using a connection to another device. Based on Gassho's disclosures for setting up a device by transmitting configuration settings to the

device from another device, a POSITA would have understood that this would enable a simpler and more efficient means for connecting the audio devices described in Spurgat to the network.

266. As such, a POSITA would have had a reasonable expectation that such a combination would succeed because both devices operate according to shared standards for wireless networking and would be operating according to their intended purposes of controlling and connecting over wireless connections. Gassho itself expressly acknowledges that “The technique of the present invention . . . is applicable to settings between various wireless communication devices including cordless phones, cell phones, and walkie-talkies.” EX1006, [0075]. That is, Gassho makes clear that its setup process does not differ for different types of “wireless communication device” that needs set up. A POSITA would have found that implementing Gassho’s setup process for Spurgat’s audio players is nothing but the use of known setup technique to improve the setup process of similar devices in the same way. That requires little variation, if any, and yields predictable results.

267. A POSITA would also have found the combination routine, straightforward, and advantageous. A proper device discovery and setup is needed before Spurgat’s digital audio players can perform other audio data sharing functions on the network. Such a use would have been routine for a POSITA as evidenced by the regularity with which those skilled in the art have grouped household items

together for describing the process of adding them to a network.

A. Independent Claim 1

268. Claim 1 is reproduced below. For ease of discussion, I have included a label for each claim limitation.

[1.P] A playback device comprising:

[1.a] a network interface that is configured to provide an interconnection with at least one data network;

[1.b] at least one processor;

[1.c] a non-transitory computer-readable medium; and

[1.d] program instructions stored on the non-transitory computer-readable medium that, when executed by the at least one processor, cause the playback device to perform functions comprising:

[1.e.1] detecting a triggering event that causes the playback device to enter a setup mode in which the playback device transmits at least a first message indicating that the playback device is available for setup;

[1.e.2] while in the setup mode, receiving a response to the first message that facilitates establishing an initial communication path with a computing device that is installed with an application for controlling the playback device, wherein the computing device is operating on a secure wireless local area network (WLAN) that is defined by an access point, wherein the initial communication path with the computing device does not traverse the access point;

[1.e.3] receiving, from the computing device via the initial

communication path, at least a second message containing network configuration parameters for the secure WLAN, wherein the network configuration parameters comprise an identifier of the secure WLAN and a security key for the secure WLAN;

[1.e.4] using the network configuration parameters to connect to the secure WLAN that is defined by the access point; and

[1.e.5] transitioning from communicating with the computing device via the initial communication path to communicating with the computing device via the secure WLAN that is defined by the access point.

1. [1.P] A playback device comprising

269. Spurgat discloses various digital audio players 110-111, 112-113, and 115-116 connected via a wireless network (“*playback device*”). (EX1007, [0034], FIGs. 1, 3, 4).

2. [1.a] a network interface that is configured to provide an interconnection with at least one data network;

270. Spurgat discloses the various digital audio players, such as digital audio players 110-111, 112-113, and 115-116, each have a “Wireless Network Interface or Wireless Communication Interface” 141 (“*network interface*”) to connect to a wireless audio network for sharing digital audio content 101 (“*data network*”). (EX1007, [0057], [0069]-[0085], FIGs. 10-13).

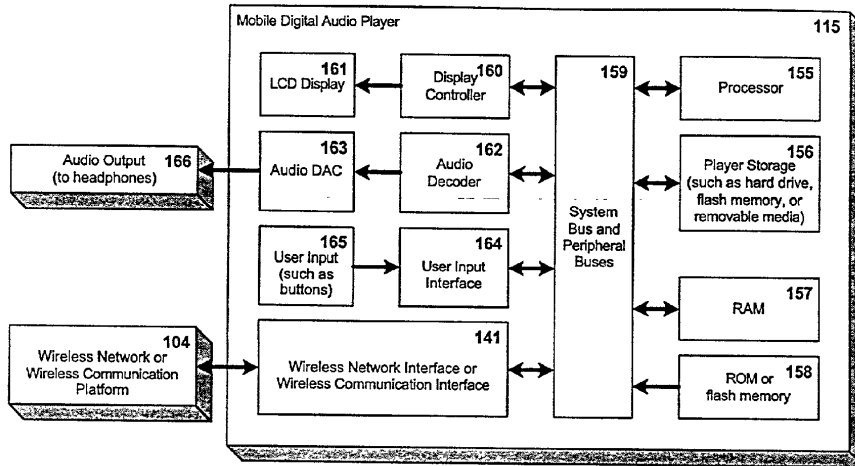


Figure 10

EX1007, FIG. 10

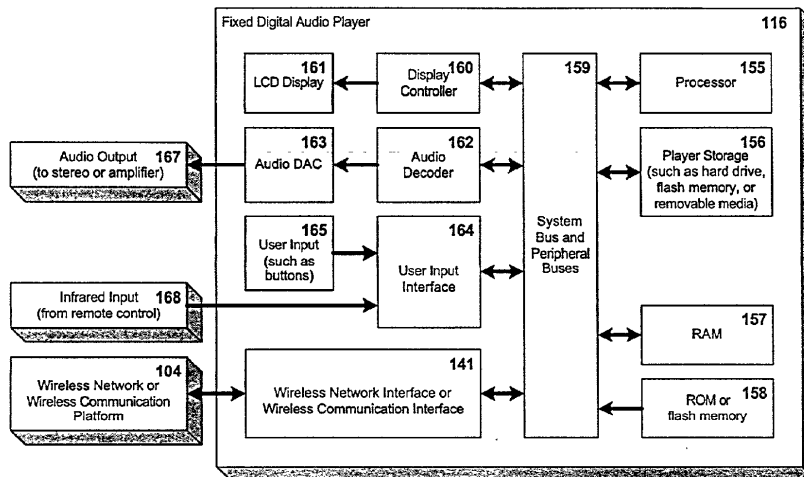


Figure 11

EX1007, FIG. 11

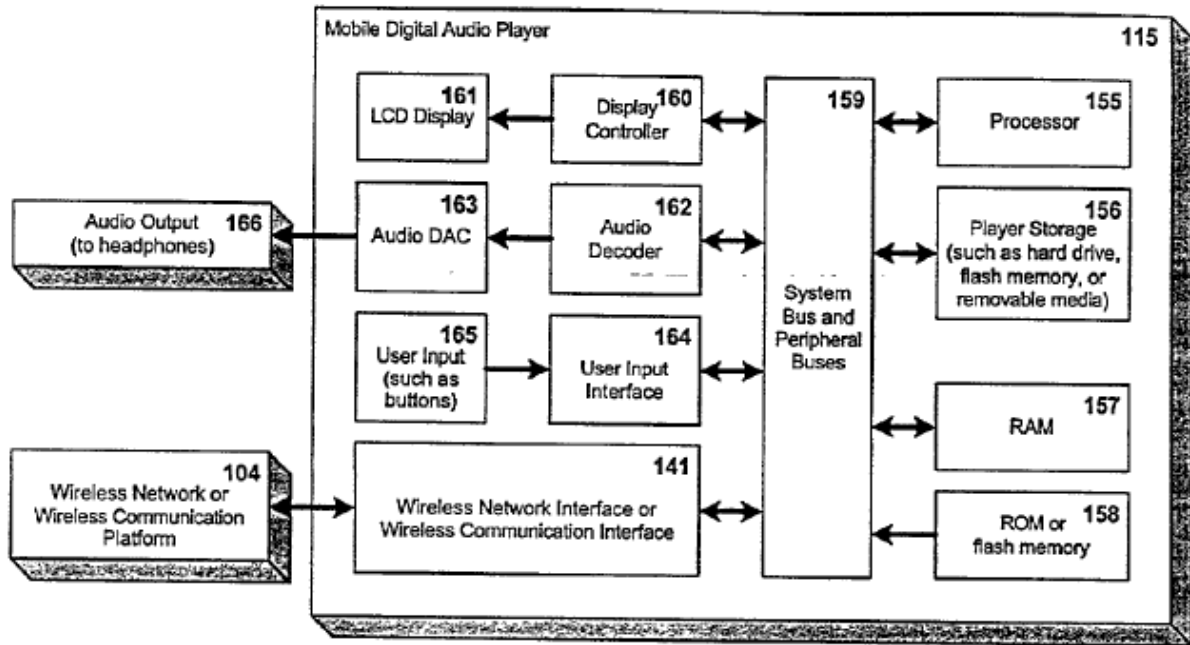
3. [1.b] at least one processor; [1.c] a non-transitory computer-readable medium; and [1.d] program instructions stored on the non-transitory computer-readable medium that, when executed by the at least one processor, cause the playback device to perform functions comprising:

271. Spurgat discloses that players contain *[1.b] at least one processor; [1.c] a non-transitory computer-readable medium; and [1.d] program instructions stored on the non-transitory computer-readable medium that, when executed by the at least one processor, cause the playback device to perform functions* described below.

272. Spurgat shows in Figs. 10-13 that digital audio players 110-111, 112-113, and 115-116 include processor 155, player storage 156, RAM 157, and ROM or flash memory 158. (EX1007, [0069]-[0085]). Spurgat also discloses “various software and firmware instructions may be stored in read only memory, or ROM, or flash memory 158 or in player storage 156” and executed by processor 155.

In general, the handheld player 111 includes a processor 155 for executing various Software and firmware instructions. The various Software and firmware instructions may be stored in read only memory, or ROM, or flash memory 158 or in player storage 156, such as a hard drive, flash memory, or removable media. The software and firmware instructions are executed by the processor 155 directly from their Storage location or are loaded into random access memory or RAM 157 to be executed from RAM 157 by the processor 155.⁴⁶

⁴⁶ EX1007, [0074].



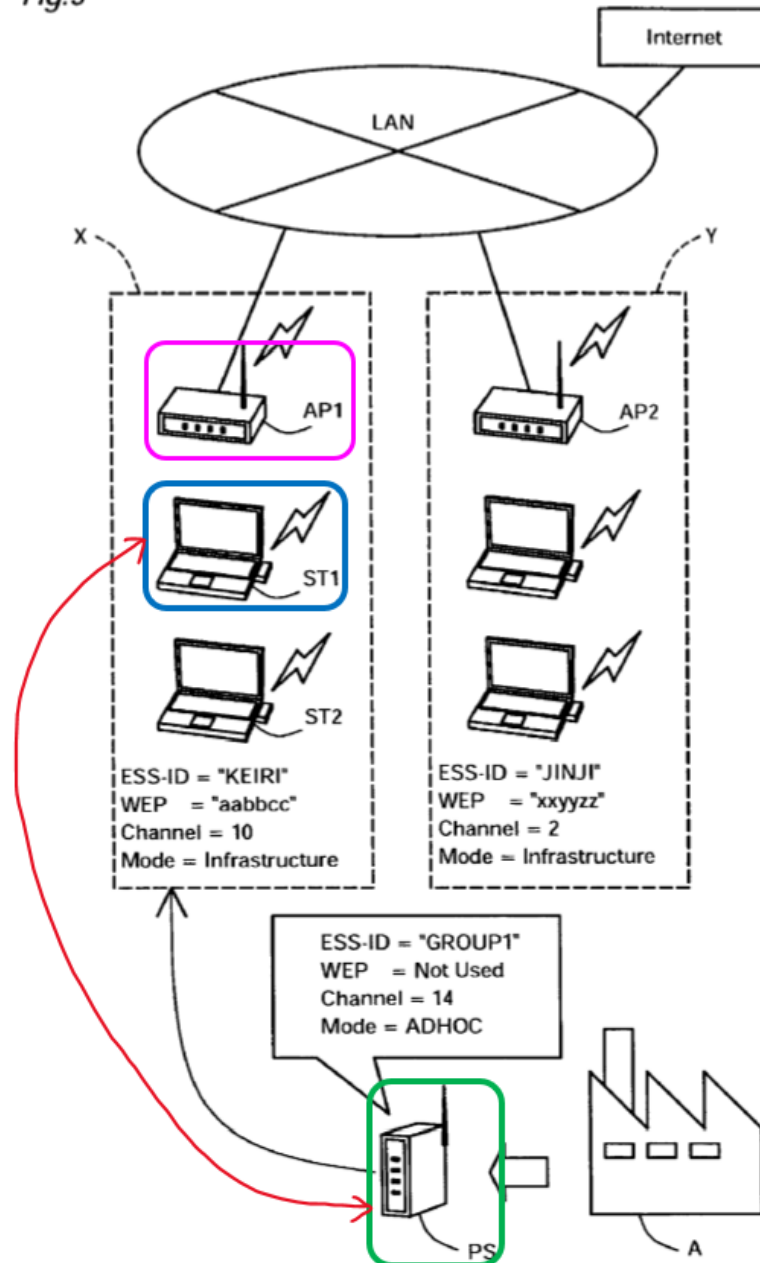
EX1007, FIG. 10

4. [1.e.1] detecting a triggering event that causes the playback device to enter a setup mode in which the playback device transmits at least a first message indicating that the playback device is available for setup;

273. Spurgat in view of Gassho discloses or renders obvious *detecting a triggering event that causes the playback device to enter a setup mode in which the playback device transmits at least a first message indicating that the playback device is available for setup.*

274. As I described above in Section XI, Gassho discloses all features of [1.e.1].

Fig.3



EX1006, FIG. 3 (Annotated)

275. Spurgat also discloses an audio player discovery process where Spurgat's "discovery handler sends a broadcast for players message" and then receives "a message response from the mobile digital audio players." (EX1007,

[0093]). These broadcast and message response are similar to the “*first message*” and “*response*” exchange in [1.e.1] and [1.e.2], except in a reverse direction. A POSITA would have understood, however, broadcasts can be made by either the new device being discovered or the controller that discovers it. In other words, a POSITA would find it equally workable for the digital audio player to send a broadcast message (“*first message*”) to the discovery handler and the discovery handler to send a message response back to the digital audio player (“*response to the first message*”), consistent with Gassho’s disclosures discussed above. Spurgat also discloses that the discovery process finally adds the new device on a list of players among with playlist and content synchronization are performed. (EX1007, [0107]-[0108], FIGs. 17, 22-23).

276. For reasons I explained above in this section, to the extent Spurgat does not specifically disclose the device setup process, a POSITA would have found it obvious to implement Gassho’s setup process, including the step of [1.e.2], described for any “wireless communication device” to setup any of Spurgat’s digital audio players 110-111, 112-113, and 115-116 to connect to Spurgat’s wireless network.

277. Thus, it is my further opinion that Spurgat in view of Gassho renders obvious this element.

5. [1.e.2] while in the setup mode, receiving a response to the first message that facilitates establishing an initial communication path with a computing device that is installed with an application for controlling the playback device, wherein the computing device is operating on a secure wireless local area network (WLAN) that is defined by an access point, wherein the initial communication path with the computing device does not traverse the access point;

278. Spurgat in view of Gassho discloses or renders obvious *while in the setup mode, receiving a response to the first message that facilitates establishing an initial communication path with a computing device that is installed with an application for controlling the playback device, wherein the computing device is operating on a secure wireless local area network (WLAN) that is defined by an access point, wherein the initial communication path with the computing device does not traverse the access point.*

279. As I described above in Section XI, Gassho discloses all features of [1.e.2].

280. Spurgat also discloses an audio player discovery process where Spurgat's "discovery handler sends a broadcast for players message" and then receives "a message response from the mobile digital audio players." (EX1007, [0093]). These broadcast and message response are similar to the "*first message*" and "*response*" exchange in [1.e.1] and [1.e.2], except in a reverse direction. A POSITA would have understood, however, broadcasts can be made by either the new device being discovered or the controller that discovers it. In other words, a

POSITA would find it equally workable for the digital audio player to send a broadcast message (“*first message*”) to the discovery handler and the discovery handler to send a message response back to the digital audio player (“*response to the first message*”), consistent with Gassho’s disclosures discussed above. Spurgat also discloses that the discovery process finally adds the new device on a list of players among with playlist and content synchronization are performed. (EX1007, [0107]-[0108], FIGs. 17, 22-23).

281. For reasons I explained above in this section, to the extent Spurgat does not specifically disclose the device setup process, a POSITA would have found it obvious to implement Gassho’s setup process, including the step of [1.e.2], described for any “wireless communication device” to setup any of Spurgat’s digital audio players 110-111, 112-113, and 115-116 to connect to Spurgat’s wireless network.

282. Thus, it is my further opinion that Spurgat in view of Gassho renders obvious this element.

6. [1.e.3] receiving, from the computing device via the initial communication path, at least a second message containing network configuration parameters for the secure WLAN, wherein the network configuration parameters comprise an identifier of the secure WLAN and a security key for the secure WLAN;

283. Spurgat in view of Gassho discloses or renders obvious *receiving, from the computing device via the initial communication path, at least a second message*

containing network configuration parameters for the secure WLAN, wherein the network configuration parameters comprise an identifier of the secure WLAN and a security key for the secure WLAN.

284. As I described above in Section XI, Gassho discloses all features of [1.e.3].

285. For reasons I explained above in this section, to the extent Spurgat does not specifically disclose the device setup process, a POSITA would have found it obvious to implement Gassho's setup process, including the step of [1.e.3], described for any "wireless communication device" to setup any of Spurgat's digital audio players 110-111, 112-113, and 115-116 to connect to Spurgat's wireless network.

286. Thus, it is my further opinion that Spurgat in view of Gassho renders obvious this element.

7. [1.e.4] using the network configuration parameters to connect to the secure WLAN that is defined by the access point; and

287. Spurgat in view of Gassho discloses or renders obvious *using the network configuration parameters to connect to the secure WLAN that is defined by the access point; and*.

288. As I described above in Section XI, Gassho discloses all features of [1.e.4].

289. For reasons I explained above in this section, to the extent Spurgat does not specifically disclose the device setup process, a POSITA would have found it obvious to implement Gassho's setup process, including the step of [1.e.4], described for any "wireless communication device" to setup any of Spurgat's digital audio players 110-111, 112-113, and 115-116 to connect to Spurgat's wireless network.

290. Thus, it is my further opinion that Spurgat in view of Gassho renders obvious this element.

8. [1.e.5] transitioning from communicating with the computing device via the initial communication path to communicating with the computing device via the secure WLAN that is defined by the access point.

291. Spurgat in view of Gassho discloses or renders obvious *transitioning from communicating with the computing device via the initial communication path to communicating with the computing device via the secure WLAN that is defined by the access point.*

292. As I described above in Section XI, Gassho discloses all features of [1.e.5].

293. For reasons I explained above in this section, to the extent Spurgat does not specifically disclose the device setup process, a POSITA would have found it obvious to implement Gassho's setup process, including the step of [1.e.5],

described for any “wireless communication device” to setup any of Spurgat’s digital audio players 110-111, 112-113, and 115-116 to connect to Spurgat’s wireless network.

294. Thus, it is my further opinion that Spurgat in view of Gassho renders obvious claim 1.

B. Dependent Claim 2: The playback device of claim 1, wherein the triggering event comprises one of (a) powering on the playback device or (b) receiving user input via a physical interface of the playback device.

295. Spurgat in view of Gassho discloses or renders obvious *wherein the triggering event comprises one of (a) powering on the playback device or (b) receiving user input via a physical interface of the playback device.*

296. As explained in Section XI, Gassho discloses, or at least makes it obvious, that the triggering event includes powering on (“*powering on the playback device*”) and/or resetting the wireless communication device (“*user input via a physical interface of the playback device*”).

297. Spurgat further discloses each digital audio player has “buttons” for user inputs and detection of the player being “turned on.” (EX1007, [0042], [0070]).

298. A POSITA would have found it obvious to combine the teaching of Spurgat and Gassho to trigger the digital audio players disclosed in Spurgat by turning it on or having the user press one or more of its buttons, for all the reasons I

explained above.

299. Thus, it is my further opinion that Spurgat in view of Gassho renders obvious this element.

C. Dependent Claim 3: The playback device of claim 1, wherein the computing device comprises a controller device of a networked audio system.

300. Spurgat in view of Gassho discloses or renders obvious *computing device comprises a controller device of a networked audio system*.

301. The claim recites a generic feature of an audio playback system unrelated to the setup process that the '883 patent purported invented.

302. Spurgat discloses a computing platform 103 (“*controller device*”) connected to various digital audio players, such as digital audio players 115 and 116 via a wireless network (“*networked audio system*”). (EX1005, [0034], FIGs. 1, 3, 4). For example, Spurgat discloses computing platform 103 can be a computer and it is “used to control mobile digital audio players 115 and fixed digital audio players 116 by changing the current playlist or the currently playing digital audio content.” (EX1005, [0036]).

303. As explained above, Gassho discloses a “station ST” that is also “a personal computer PC,” which is used to control the radio print server PS to receive print data via wireless communication and “causes a printer connected via a cable to print the input print data.” (EX1006, [0040], [0054]). Therefore, a POSITA would

have understood that Gassho discloses ST as a controller device to the device that sets up.

304. A POSITA would have found it routine, straightforward, and advantageous to use Spurgat's computing platform 103, also a computer, to perform the setup functions performed by ST station to set up the networked audio device, including digital audio players 110-111, 112-113, and 115-116, in a similar way as described in Gassho, and then control it as a networked audio system. A POSITA would have known that such an application (yielding the claimed limitations) would predictably work and provide the expected results. A POSITA would also have found the combination routine, straightforward, and advantageous to make the combination for all the reasons explained above.

D. Dependent Claim 4: The playback device of claim 1, further comprising program instructions stored on the non-transitory computer-readable medium that, when executed by the at least one processor, cause the playback device to perform functions comprising after receiving the second message, providing an indication that the playback device has successfully received the network configuration parameters for the secure WLAN.

305. Spurgat in view of Gassho discloses or renders obvious *after receiving the second message, providing an indication that the playback device has successfully received the network configuration parameters for the secure WLAN.*

306. As I described above in Section XI, Gassho discloses all features of this claim.

307. Spurgat discloses that the player sends a “content acknowledge message” (“*indication*”) after receiving the audio content. (EX1007, [0091]).

308. For reasons I explained above in this section, to the extent Spurgat does not specifically disclose the device setup process, a POSITA would have found it obvious to implement Gassho’s setup process, including the features of this claim , described for any “wireless communication device” to setup any of Spurgat’s digital audio players 110-111, 112-113, and 115-116 to connect to Spurgat’s wireless network. A POSITA would also have found it obvious for the digital audio players disclosed in Spurgat to send a similar acknowledge message after receiving the content of network configuration parameters.

309. Thus, it is my further opinion that Spurgat in view of Gassho renders obvious claim 4.

E. Dependent Claim 5: The playback device of claim 4, wherein providing the indication comprises transmitting, to the computing device via the initial communication path, at least a third message indicating that the playback device has successfully received the network configuration parameters.

310. Spurgat in view of Gassho discloses or renders obvious *after receiving the second message, providing an indication that the playback device has successfully received the network configuration parameters for the secure WLAN.*

311. As I described above in Section XI, Gassho discloses all features of this claim.

312. Spurgat discloses that the player sends a “content acknowledge message” (“*third message*”) after receiving the audio content. (EX1007, [0091]).

313. For reasons I explained above in this section, to the extent Spurgat does not specifically disclose the device setup process, a POSITA would have found it obvious to implement Gassho’s setup process, including the features of this claim, described for any “wireless communication device” to setup any of Spurgat’s digital audio players 110-111, 112-113, and 115-116 to connect to Spurgat’s wireless network. A POSITA would also have found it obvious for the digital audio players disclosed in Spurgat to send a similar acknowledge message after receiving the content of network configuration parameters.

314. Thus, it is my further opinion that Spurgat in view of Gassho renders obvious claim 5.

F. Dependent Claim 6: The playback device of claim 4, wherein providing the indication comprises providing an indication that the playback device has successfully connected to the secure WLAN using the network configuration parameters.

315. Spurgat in view of Gassho discloses or renders obvious *after receiving the second message, providing an indication that the playback device has successfully received the network configuration parameters for the secure WLAN.*

316. As I described above in Section XI, Gassho discloses all features of this claim.

317. For reasons I explained above in this section, to the extent Spurgat does not specifically disclose the device setup process, a POSITA would have found it obvious to implement Gassho's setup process, including the features of this claim, described for any "wireless communication device" to setup any of Spurgat's digital audio players 110-111, 112-113, and 115-116 to connect to Spurgat's wireless network.

318. Thus, it is my further opinion that Spurgat in view of Gassho renders obvious claim 6.

G. Dependent Claim 7: The playback device of claim 1, further comprising program instructions stored on the non-transitory computer-readable medium that, when executed by the at least one processor, cause the playback device to perform functions comprising after connecting to the secure WLAN, establishing a new networked audio system on the secure WLAN and Dependent Claim 8: after connecting to the secure WLAN, joining an existing networked audio system operating on the secure WLAN.

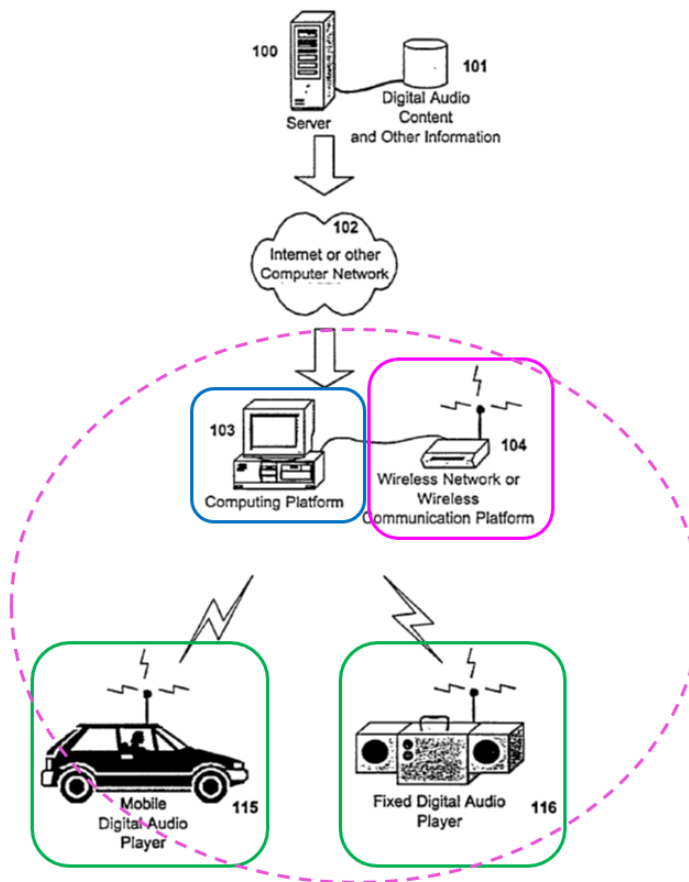
319. Spurgat in view of Gassho discloses or renders obvious *after connecting to the secure WLAN, establishing a new networked audio system on the secure WLAN; and after connecting to the secure WLAN, joining an existing networked audio system operating on the secure WLAN.*

320. Both claims recite generic operations of the playback device after setup, unrelated to the setup process itself that the '883 patent purported invented.

321. As I described above in Section XI, Gassho discloses all features of

claims 7 and 8.

322. Spurgat explicitly discloses that digital audio players and the controller, such as the “various digital audio players 115 and 116” and computing platform 103 (itself can be a player) are grouped to establish “*a new networked audio system*” to synchronize audio content among them. EX1007, [0034]-[0036]. Spurgat further discloses that a digital audio player newly discovered device is added to “a list of players in proximity,” thus joining “*an existing networked audio system.*” EX1007, [0092]-[0097].



EX1007, FIG. 1 (Annotated)

323. A POSITA reading Spurgat would have found it routine, straightforward, and advantageous to apply the same to the Gassho-disclosed wireless communication device after it joins the network. It would also have been obvious to a POSITA that when the audio device joins a network to playback content on the network, it will either establish a new networked audio system or to join an existing one, as taught by Spurgat, for the user experience of seamlessly enjoying her playlist, and indeed, Spurgat itself provides teaching, suggestions, or motivation that would have led a POSITA to do so. EX1007, [0043], [0098].

324. A POSITA would have known such a combination (yielding the claimed limitations) would provide expected results with reasonable expectation of success.

325. Thus, Spurgat in view of Gassho renders obvious the additional features recited in both Claim 7 and Claim 8.

H. Dependent Claims 9: The playback device of claim 1, further comprising program instructions stored on the non-transitory computer-readable medium that, when executed by the at least one processor, cause the playback device to perform functions comprising receiving, from the computing device, a command to assign a name to the playback device.

326. Spurgat in view of Gassho discloses or renders obvious *receiving, from the computing device, a command to assign a name to the playback device.*

327. Spurgat also discloses various operations the gateway does to flag,

unflag, or otherwise select specific players on the list. EX1005, [0095]. A POSITA reading Spurgat would have understood that each player on the “list” thus must be assigned a name by the gateway for identification purpose so that the gateway can tell one player from another on the list.

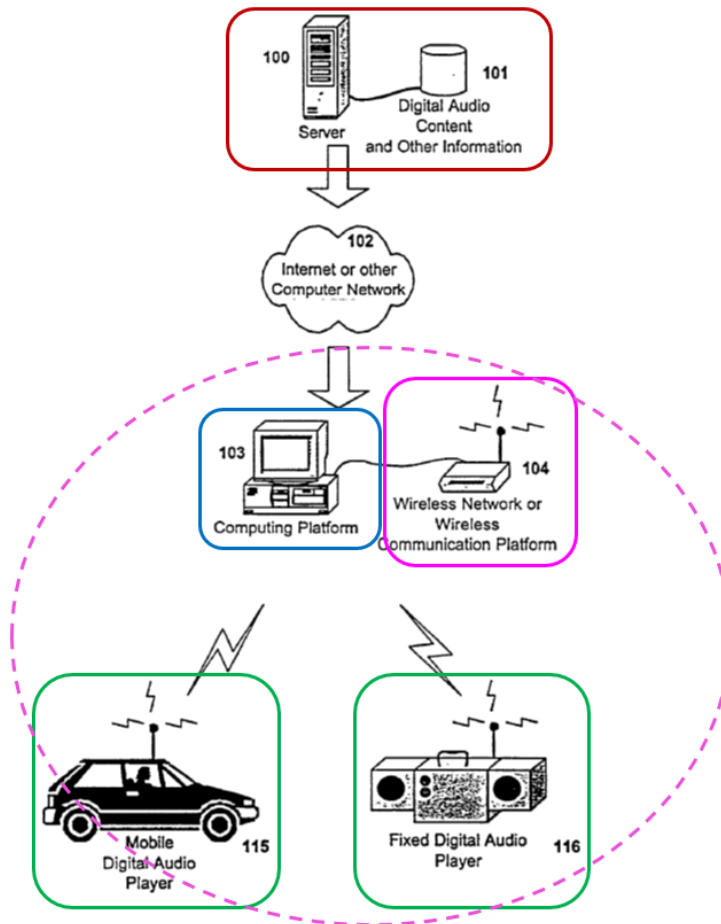
328. A POSITA reading Spurgat would have found it routine, straightforward, and advantageous to assign a name, as taught by Spurgat, to the Gassho-disclosed configured device after it joins the network. By assigning a name, a POSITA would understand that Spurgat supports greater control for the user to distinguish between devices, provide individual commands and configurations, and overall allow much more user friendly features and less confusion and frustration trying to identify between identical devices.

I. Dependent Claim 10: The playback device of claim 1, wherein communicating with the computing device via the secure WLAN comprises receiving a command related to playback of audio content.

329. Spurgat in view of Gassho discloses or renders obvious *wherein communicating with the computing device via the secure WLAN comprises receiving a command related to playback of audio content.*

330. Spurgat discloses “a computing platform 103, for example, a personal computer, is used as a gateway to enable various digital audio players 115 and 116” to access digital audio content “from the servers 100 that are connected to the

computing platform 103 through the Internet or other computer network 102,” and “computing platform 103 may also be used to control mobile digital audio players 115 and fixed digital audio players 116 by changing the current playlist or the currently playing digital audio content.” EX1007, [0034]-[0036], FIG. 1 (annotated). Therefore, Spurgat discloses the computing platform 103 (“*computing device*”) may send commands to audio players 115 and 116 for digital audio playback (“*command related to playback of audio content*”).



EX1007, FIG. 1 (Annotated)

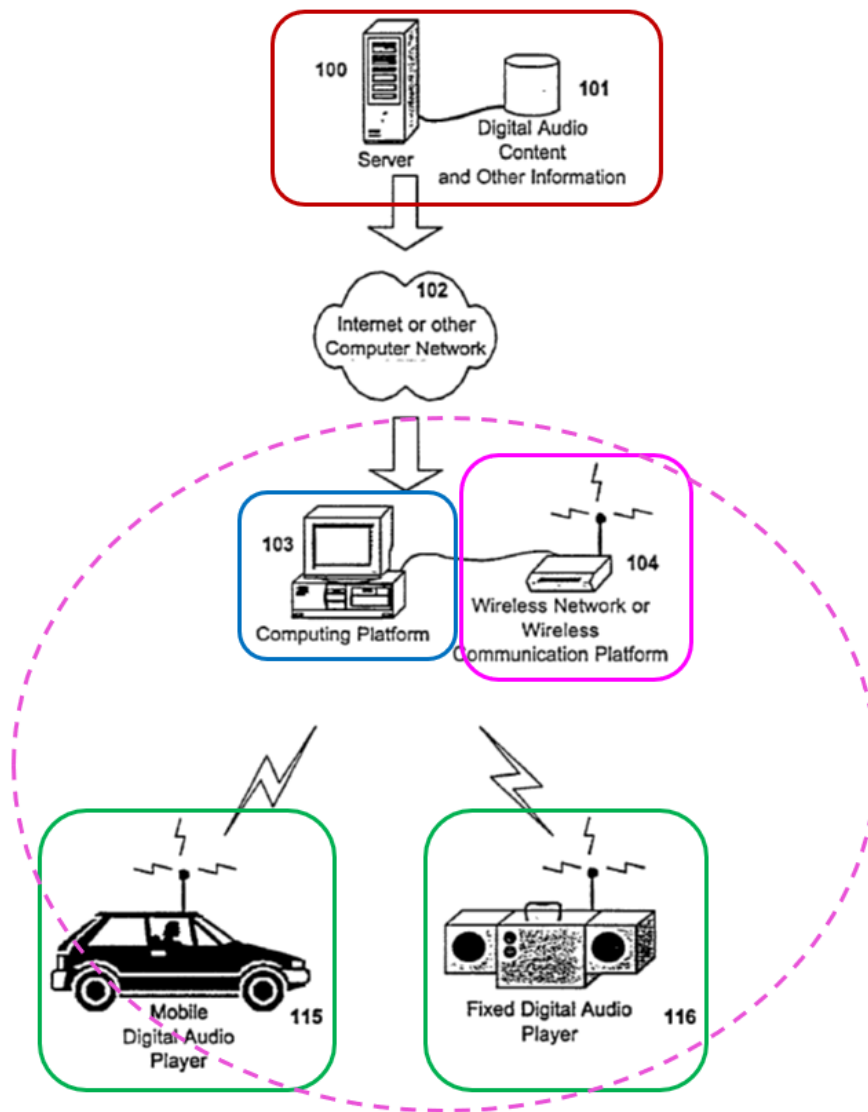
331. A POSITA reading Spurgat would have found it routine, straightforward, and advantageous to command to the digital audio players for audio playback, as taught by Spurgat, after they join the network, using Gassho-disclosed setup methods.

332. Thus, it is my further opinion that Spurgat in view of Gassho renders obvious claim 10.

J. Dependent Claim 11: The playback device of claim 10, wherein the command comprises a command to retrieve audio content for playback from an audio source that is accessible via a communication path that includes the secure WLAN, and wherein the playback device further comprises program instructions stored on the non-transitory computer-readable medium that, when executed by the at least one processor, cause the playback device to perform functions comprising: in response to receiving the command, retrieving the audio content from the audio source via the communication path that includes the secure WLAN.

333. Spurgat in view of Gassho discloses or renders obvious *wherein the command comprises a command to retrieve audio content for playback from an audio source that is accessible via a communication path that includes the secure WLAN, and wherein the playback device further comprises program instructions stored on the non-transitory computer-readable medium that, when executed by the at least one processor, cause the playback device to perform functions comprising: in response to receiving the command, retrieving the audio content from the audio source via the communication path that includes the secure WLAN.*

334. Spurgat discloses “a computing platform 103, for example, a personal computer, is used as a gateway to enable various digital audio players 115 and 116” to access digital audio content “from the servers 100 that are connected to the computing platform 103 through the Internet or other computer network 102,” and “computing platform 103 may also be used to control mobile digital audio players 115 and fixed digital audio players 116 by changing the current playlist or the currently playing digital audio content.” EX1007, [0034]-[0036], FIG. 1 (annotated). Therefore, Spurgat discloses the computing platform 103 (“*computing device*”) may send commands for the player to access and retrieve audio content from audio sources like servers 100 (“*command to retrieve audio content for playback from an audio source*”), and in response to receiving the commands, the players retrieve the audio content from the audio sources accordingly. The retrieval would have to be through a path that includes the local wireless network 104, which connects the digital audio players and computing platform 103, the access device to the external network such as Internet or other computer network 102.



EX1007, FIG. 1 (Annotated)

335. A POSITA reading Spurgat would have found it routine, straightforward, and advantageous to command to the digital audio players to retrieve the audio content from an audio source, as taught by Spurgat, after they join the network, using Gassho-disclosed setup methods.

336. Thus, it is my further opinion that Spurgat in view of Gassho renders

obvious claim 11.

- K. Dependent Claim 12: The playback device of claim 1, wherein the second message comprises a command for the playback device to adopt the network configuration parameters.**

337. Spurgat in view of Gassho discloses or renders obvious *wherein the command comprises a command to retrieve audio content for playback from an audio source that is accessible via a communication path that includes the secure WLAN, and wherein the playback device further comprises program instructions stored on the non-transitory computer-readable medium that, when executed by the at least one processor, cause the playback device to perform functions comprising: in response to receiving the command, retrieving the audio content from the audio source via the communication path that includes the secure WLAN.*

338. As I described above in Section XI, Gassho discloses all features of this claim.

339. For reasons I explained above in this section, to the extent Spurgat does not specifically disclose the device setup process, a POSITA would have found it obvious to implement Gassho's setup process, including the features of this claim, described for any "wireless communication device" to setup any of Spurgat's digital audio players 110-111, 112-113, and 115-116 to connect to Spurgat's wireless network.

340. Thus, it is my further opinion that Spurgat in view of Gassho renders

obvious claim 12.

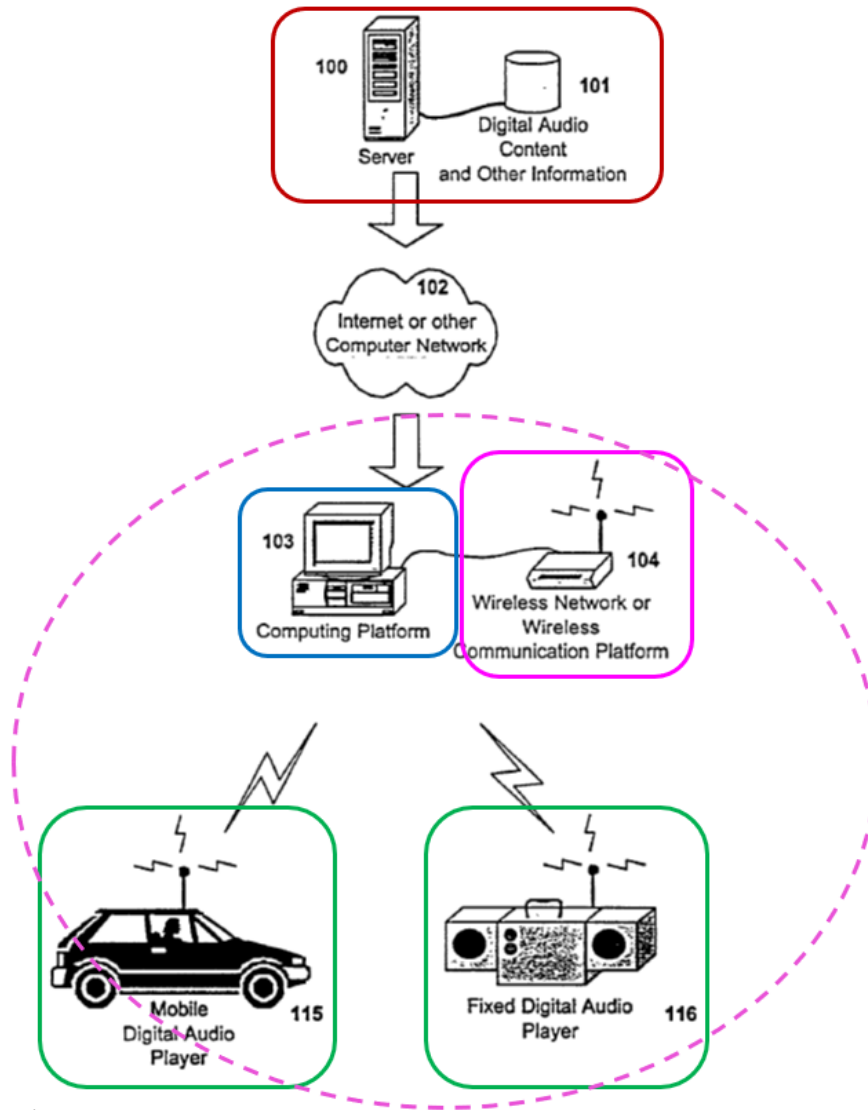
- L. Dependent Claim 13: The playback device of claim 1, after transitioning to communicating with computing device via the secure WLAN, receiving, from the computing device, a command to form a group with at least a first playback device of a networked audio system such that the playback device is configured to play back audio content in synchrony with at least the first playback device.**

341. Spurgat in view of Gassho renders obvious *after transitioning to communicating with computing device via the secure WLAN, receiving, from the computing device, a command to form a group with at least a first playback device of a networked audio system such that the playback device is configured to play back audio content in synchrony with at least the first playback device.*

342. Spurgat discloses multiple digital audio players, such as 115 and 116, in a networked audio system as shown in FIG. 1, (*“form a group with at least a first playback device of a networked audio system”*), and that each digital audio player in that group synchronizes digital audio content, such as playlists, with other digital audio players, which allows a user to move from one player to another and able to listen to “the same music and playlist in a seamless manner” (*“play back audio content in synchrony with at least the first playback device”*). EX1007, [0036], [0043], [0099].

343. A POSITA reading Spurgat would have found it routine, straightforward, and advantageous to let the digital audio players to play in

synchrony, as taught by Spurgat, after they join the network, using Gassho-disclosed setup methods.



EX1007, FIG. 1 (Annotated)

M. Dependent Claims 14-20

344. As described above in grounds 4-5, elements of claims 14 and 20 correspond to elements explained and analyzed in claim 1. Elements of claims 15-

18 correspond to elements explained and analyzed in claims 2 and 4-6, respectively. Claim 19 correspond to elements explained and analyzed in claims 10 and 11. For the same reasons I have set forth above in this Section for grounds 4-5, it is my opinion that Spurgat in view of Gassho renders obvious claims 14-20.

XIII. Additional Remarks

345. I currently hold the opinions expressed in this declaration. But my analysis may continue, and I may acquire additional information and/or attain supplemental insights that may result in added observations.

346. In signing this declaration, I recognize 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 also recognize that I may be subject to cross-examination in the 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.

347. I have reviewed the accompanying Petition for *Inter Partes* Review of the '883 Patent and, given the information set forth in this declaration, I agree with the reasoning and conclusions of the grounds of challenge in the petition. Based on my own analysis, I agree that: (1); Rector anticipates claims 1-8, 10-12, and 14-20 (2); Rector renders obvious claims 1-8, 10-12, and 14-20 (3); Rector in view of Richenstein renders obvious claims 3, 7-11, 13, and 19 (4); Gassho anticipates

claims 1-8, 12, and 14-20 (5); Gassho renders obvious claims 1-8, 12, and 14-20 and
(6) Spurgat in view of Gassho renders obvious claims 1-20.

* * *

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true. I further declare 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 the Title 18 of the United States Code and that such willful false statements may jeopardize the validity of this proceeding.

Dated: 2-3-25

By: 
Dr. Bruce Hartpence
Rochester, NY

APPENDIX A

BRUCE HARTPENCE

ISCHOOL, GCCIS, RIT, Rochester, NY 14623

bhhics@rit.edu

A. Professional Preparation

- Finger Lakes Community College, Canandaigua, NY, Computer Science, A.S., 1993
- Rochester Inst of Technology, Rochester, NY, Information Technology, B.S., 1996
- Rochester Inst of Technology, Rochester, NY, Information Technology, M.S., 1998
- Rochester Inst of Technology, Rochester, NY, Computing and Info Sci, Ph.D., 2020

B. Appointments

2016-present Professor, ISCHOOL, GCCIS, RIT

Rochester Institute of Technology, Rochester, NY

2007-2015 Associate Professor, NSSA/IST Departments, RIT

Rochester Institute of Technology, Rochester, NY

1998-2007 Assistant Professor, NSSA/IST Departments, RIT

Rochester Institute of Technology, Rochester, NY

1990-1994 Electrical Technician

Mobil Chemical, Macedon, NY

1984-1990 Nuclear Electrician

U.S. Navy, U.S.S. Enterprise (CVN-65)

C. Products

Recent Publications:

1. B. Hartpence, D. Johnson, B. Stackpole and A. Kwasinski, "RIT Network and Security Dataset Collections," 2024 International Symposium on Networks, Computers and Communications (ISNCC), Washington DC, DC, USA, 2024, pp. 1-6, doi: 10.1109/ISNCC62547.2024.10759040.
2. B. Hartpence, D. Johnson, B. Stackpole and A. Kwasinski, "RIT Network and Security Dataset Collections," 2024 International Symposium on Networks, Computers and Communications (ISNCC), Washington DC, DC, USA, 2024, pp. 1-6, doi: 10.1109/ISNCC62547.2024.10759040.
3. Hartpence, Bruce, and Andres Kwasinski. "CNN and MLP Neural Network Ensembles for Packet Classification and Adversary Defense." 2021 Intelligent and Converged Networks, IEEE, 2021.
4. Hartpence, Bruce. Neural Network Architectures and Ensembles for Packet Classification: Addressing Visibility, Security and Quality of Service Challenges in Communication Networks. Rochester Institute of Technology, 2020.

5. Hartpence, Bruce, and Andres Kwasinski. "A Convolutional Neural Network Approach to Improving Network Visibility." 2020 29th Wireless and Optical Communications Conference (WOCC). IEEE, 2020.
6. Hartpence, Bruce, Andres Kwasinski, "Combating TCP Port Scan Attacks Using Sequential Neural Networks", IEEE ICNC, 2020.
7. Hartpence, Bruce, Andres Kwasinski, "Considering the Blackbox: An Investigation of Optimization Techniques with Completely Balanced Datasets of Packet Traffic", IEEE Big Data, 2019.

Other significant publications:

1. Hartpence, Bruce, and Rossi Rosario. "Software Defined Networking for Systems and Network Administration Programs." The USENIX Journal of Education in System Administration (2016): 12.
2. Sharma, et al., "Performance of Meshed Tree Protocols for Loop Avoidance in Switched Networks", Sharma et al., ICNS 2014
3. Hartpence, Bruce, Kwasinski, A., "Fast Internet Packet and Flow Classification Based on Artificial Neural Networks", IEEE Southeastcon, 2019.
4. Hartpence, Bruce, "Performance Evaluation of Networks with Physical and Virtual Links", IEEE Global Information Infrastructure and Networking Symposium (GIIS), 2015.
5. Hartpence, Bruce. "Curricular and performance measurement challenges in cloud environments." Proceedings of the 15th Annual Conference on Information technology education. 2014.
6. Hartpence, Bruce, "The Packet Guide to Voice over IP", O'Reilly Publishing, 2013.
7. Hartpence, Bruce, "The Packet Guide to Routing and Switching", O'Reilly Publishing, 2011.
8. Hartpence, Bruce, "The Packet Guide to Core Network Protocols", O'Reilly Publishing, 2010.

D. Synergistic Activities

1. RIT Network and Security Research Project: Data Science and Machine Learning for Network Challenges and DNS Security, 2023-present.
2. Standards work: IEEE project 1910.1 - Standard for Meshed Tree Bridging with Loop Free Forwarding (2015-2021)
3. Rochester Institute of Technology Software Defined Network testbed construction and dataset creation. This was a virtualization cluster and physical network testbed deploying Open Daylight controllers and the OpenFlow protocol. (2017-2019)
4. Meshed Tree Protocol Design: This project seeks to improve upon convergence times for layer networks experiencing outages or looped topologies. This foundational work resulted in the formation of an IEEE working group under 802.1. (2012-2013)
5. Virtualization cluster and SAN construction: A major goal of the grant work is to disseminate network and security curricula and ideas to schools named in the grant. This project has resulted in the creation of several smaller projects and papers including the creation of several small clusters based on VMWare ESXi, course development work and security competition architectures. (2010-2013)
6. UNCF Special Programs Corporation (UNCFSP) entitled, "Implementation of a Student Technical Assistance Need-based Developmental Undergraduate Program (STANDUP)", for the NASA Administrator's Fellowship Project (NAFP) Research Award. Oakwood College, Roper, E. (2010)

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CV Addendum

1. History of employment/consulting in expert field

a. Network and VoIP Training and Material Creation (2008-2014)

These were a lengthy series of both on-site and on campus training programs. They incorporated a wide variety of topics ranging from basic networking and protocols to Voice over IP.

Microwave Data Systems

Harris RF (includes license agreement for materials)

Wegmans Food Markets

b. Trocaire College Program Review (2010-2011)

This was a complete review of the existing program, students and the local job market. The final report included recommendations for the future of the program and modifications to be made.

c. Liban (now Vnomics) Wireless Site Survey and System Research (2010-2011)

I was engaged to assist in the development of an intelligent system for monitoring onboard trucking systems. This also included wireless site survey at proposed deployment locations.

d. IEEE 1910.1 Standards Creation (2015-2020)

2. **Expert Witness History:** A listing of cases in which you've been retained as an expert within the last five years.

NA

3. **Patent History**

NA