

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SONY GROUP CORPORATION, SONY CORPORATION, SONY
CORPORATION OF AMERICA, AND SONY ELECTRONICS, INC.,

Petitioner,

v.

INMUSIC BRANDS, INC.,

Patent Owner.

IPR2023-00294

Patent 7,567,498 B2

Before GREGG I. ANDERSON, CHRISTA P. ZADO, and
IFTIKHAR AHMED, *Administrative Patent Judges*.

ZADO, *Administrative Patent Judge*.

JUDGMENT

Final Written Decision

Determining All Challenged Claims Unpatentable

35 U.S.C. § 318(a)

I. INTRODUCTION

We have jurisdiction to hear this *inter partes* review under 35 U.S.C. § 6. This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a). For the reasons discussed herein, upon examination of the entirety of the record in this proceeding, we determine that Sony Group Corporation, Sony Corporation, Sony Corporation of America, and Sony Electronics, Inc. (collectively, “Petitioner”) has shown by a preponderance of the evidence that challenged claims 1–6 (“the challenged claims”) of U.S. Patent No. 7,567,498 B2 (Ex. 1001, “the ’498 patent”) are unpatentable.

A. Background

Petitioner filed a Petition (Paper 2, “Pet.” or “Petition”) for *inter partes* review of the challenged claims of the ’498 patent, along with the Declaration of Dr. Todd K. Moon (Ex. 1002). InMusic Brands, Inc. (“Patent Owner”) timely filed a Preliminary Response. Paper 6 (“Prelim. Resp.”). With our authorization,¹ Petitioner filed a Reply (Paper 8) and Patent Owner filed a Sur-Reply (Paper 9).

On July 25, 2023 we instituted an *inter partes* review. Paper 10 (“Inst. Dec.” or “Institution Decision”).

Subsequent to Institution, Patent Owner filed a Patent Owner Response (Paper 18, “PO Resp.”), along with the Declaration of Ivan Zatkovich (Ex. 2004). Petitioner filed a Reply (Paper 21, “Pet. Reply”) to the Patent Owner Response. Patent Owner filed a Sur-Reply (Paper 24, “PO Sur-Reply”).

¹ See our May 24, 2023 Order authorizing a Reply and Sur-Reply. Paper 7.

Petitioner filed Objections to Evidence (Paper 19), but did not file a motion to exclude. Accordingly, Petitioner has not preserved its objections. 37 C.F.R. § 42.64(c).

An oral hearing was conducted on April 25, 2024. A transcript of the hearing is included in the record. Paper 27 (“Tr.”).

B. Real Party-in-Interest

Petitioner identifies itself as the only real party in interest. Pet. 7. Patent Owner identifies itself as the only real party in interest. Paper 5, 2; Paper 12, 2.

C. Related Matters

The parties identify the following as related district court matters in which the ’498 patent was asserted:

InMusic Brands, Inc. v. Sony Corporation of America, No. 23-1771 (Fed. Cir.), docketed April 20, 2023;

InMusic Brands, Inc. v. Sony Corporation of America, No. 1:22-cv-06609 (S.D.N.Y.) (filed Aug. 3, 2022);²

² In the Institution Decision, we noted that the parties appeared to have erroneously identified the proceeding as ending in “06609,” and instead appeared to have intended to refer to proceeding No. 1:22-cv-06602. Inst. Dec. 3 n.2 (citing Pet. 7; Paper 5, 2). After institution, Patent Owner filed an amended Mandatory Notice, and continued to erroneously refer to the proceeding as “06609,” and continued to refer to the proceeding ending in “06609” as active, even though Case No. 1:22-cv-06609 was closed on August 10, 2022, only seven days after the case’s filing date. Paper 12, 2; Ex. 3002.

InMusic Brands, Inc. v. Sony Corporation of America, No. 1:22-cv-06602 (S.D.N.Y.) (filed Aug. 3, 2022) (dismissed);³

InMusic Brands, Inc. v. Innovative Technology Electronics, LLC, No. 2:22-cv-02670 (E.D.N.Y.) (filed May 9, 2022) (dismissed);

InMusic Brands, Inc. v. Music Hall, LLC, No. 2:22-cv-02575 (E.D.N.Y.) (filed May 5, 2022) (dismissed);

InMusic Brands, Inc. v. Pyle Pro Audio Corp., No. 1:22-cv-02305 (E.D.N.Y.) (filed Apr. 22, 2022) (dismissed);

InMusic Brands, Inc. v. Spectra Merchandising International, Inc., No. 1:21-cv-05882 (N.D.Ill.) (filed Nov. 3, 2021) (dismissed); and

InMusic Brands, Inc. v. Curtis International Ltd., No. 1:21-cv-00287 (D.R.I.) (filed July 12, 2021) (dismissed).

Pet. 7–8; Paper 5, 2–3; Paper 12, 2–3.

D. The '498 Patent (Ex. 1001)

The '498 patent is titled “Phonographic Turntable with Built-In Audio to USB or Firewire Device” and relates generally to “a turntable [(e.g., vinyl record player)] which includes an internal analog to digital converter and a controller for a standard digital format.” Ex. 1001, code (54), Abstract. The '498 patent compares analog audio and digital audio, stating that “[t]he standard phonographic turntable, as an analog device, is diminishing in commercial popularity due to the ever increasing capabilities of digital music equipment.” Ex. 1001, 1:13–15. However, because the standard

³ The parties identify the proceeding as No. 1:22-cv-06609. Pet. 7; Paper 5, 2. In addition, Petitioner identifies the case as active. Pet. 7. However, the correct proceeding is No. 1:22-cv-06602, and after the filing of the Petition the case was terminated. Ex. 2001 (district court dismissal order).

phonographic turntable “is embedded within the disk jockey culture at dance clubs and similar institutions,” efforts have been made to digitize analog audio signals generated by a turntable. *Id.* at 1:22–38. For example, some applications have connected the turntable’s line level output (which outputs an analog audio signal) to an analog input of a computer soundcard, or have used a device external to the turntable to perform analog to digital conversion between the turntable and the computer soundcard. *Id.* at 1:25–30. In another example, some turntables include a Sony/Phillips Digital Interface (SPDIF) to provide digital audio output. *Id.* at 1:35–38. However, according to the ’498 patent, the SPDIF “is not a standard protocol such as USB (universal serial bus) or firewire (IEEE 1394).” *Id.*

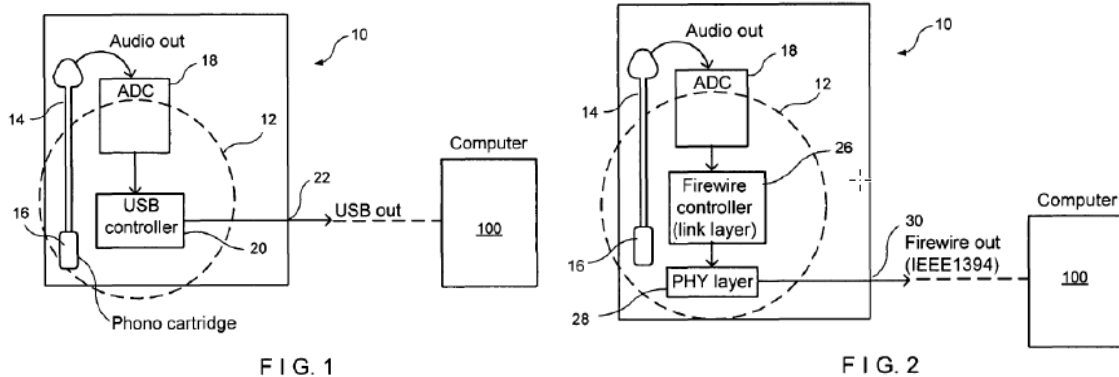
In light of the above-mentioned considerations, the ’498 patent states the objects of the invention are to provide a turntable that: (1) includes digital output in a standard protocol, such as USB or firewire; (2) eliminates the need for external audio conversion devices; and (3) maintains the familiar feel of a standard turntable to a disk jockey or similar operator. *Id.* at 1:43–51. According to the ’498 patent, the objects of the invention are “attained by providing a turntable with such conventional features as a revolving platter, a pivoting tonearm and an analog phono cartridge and further providing an audio conversion device to USB, firewire or other standard computer digital communication protocol internally within the turntable.” *Id.* at 1:52–57.

The detailed description of the preferred embodiments consists of a single column, lines 7 to 58. The ’498 patent describes the turntable as having a conventional tonearm, conventional rotatable platter, and conventional phono cartridge for generating a conventional analog electrical

audio signal from a conventional long playing (LP) vinyl record. *Id.* at 2:10–18. The conventional audio signal is received by an analog to digital converter (ADC) that outputs a signal to a USB controller that are within the turntable. *Id.* at 2:18–23. The USB controller causes a USB signal to be generated and output via a USB jack to an external computer so that the USB signal (a digital audio signal) can be processed by a computer. *Id.* The detailed description of the USB embodiment is only 22 lines, roughly half of which describe conventional features of a turntable. *Id.* at 2:7–28. To the extent that the internal ADC and USB controller are described, the '498 patent simply states in a few sentences what these components do and where they are located. *Id.* at 2:18–28.

The remainder of the detailed description is of a firewire embodiment whose description is similar to that of the USB embodiment and consists of roughly 25 lines. *Id.* at 2:29–52.

Figures 1 and 2 of the '498 patent, reproduced below, illustrate the disclosed invention.



Figures 1 and 2 of the '498 patent each show a schematic diagram of a turntable that includes, respectively, a USB controller and firewire controller.

Figures 1 and 2 each show a schematic diagram of a turntable that is directed, respectively, to a USB embodiment and firewire embodiment. Each Figure shows turntable 10 having tonearm 14, phono cartridge 16, rotatable platter 12, and ADC 18. *Id.* at 2:9–19, 2:29–40. Figure 1 further includes USB controller 20, and Figure 2 further includes firewire controller 26. *Id.* at 2:19–22, 2:40–46.

E. Challenged Claims

Petitioner challenges claims 1–6 of the '498 patent. Pet. 8. Claim 1 is the only independent claim of the '498 patent. Claim 1 is reproduced below with annotations in brackets as set forth in the Petition.

1. [1a] A turntable including:

[1b] a rotatable platter;

[1c] a tonearm for receiving a phono cartridge for generating an analog audio signal representative of an audio recording;

[1d] an analog to digital converter for receiving an analog audio signal from the phono cartridge; and

[1e] a controller responsive to said analog to digital converter for generating an output digital audio signal of music or speech representative of an audio recording from an output of said analog to digital converter, representative of said analog audio signal;

[1f] wherein said analog to digital converter and said controller are included within said turntable; and

[1g] wherein said output digital audio signal is output from said turntable and uses standard computer protocol.

Ex. 1001, 2:60–3:7; Pet. 17.

F. Asserted Prior Art References and Declarations

Reference or Declaration	Date	Exhibit No.
EP 0 999 553 A1 (“Cortellesi”)	May 10, 2000	1004
U.S. Pat. Appl. Publication No. 2004/0089795 A1 (“Spencer”)	May 13, 2004	1005
U.S. Pat. Appl. Publication No. 2003/0206506 A1 (“Cohen”)	Nov. 6, 2003	1006
U.S. Pat. Appl. Publication No. 2003/0131715 A1 (“Georges”)	July 17, 2003	1013
Declaration of Dr. Todd K. Moon (“Moon Dec.”)	Nov. 7, 2022	1002
Declaration of Ivan Zatkovich (“Zatkovich Dec.”)	Nov. 9, 2023	2004

G. Asserted Grounds of Unpatentability

Claim(s) Challenged	35 U.S.C. §	Reference(s)
1, 2, 4–6	103	Cortellesi
3	103	Cortellesi, Georges
1, 2, 4–6	103	Spencer, Cohen
3	103	Spencer, Cohen, Georges

II. ANALYSIS

A. Level of Ordinary Skill

In determining whether an invention would have been obvious at the time it was made, we consider the level of ordinary skill in the pertinent art at the time of the invention. *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966). “The importance of resolving the level of ordinary skill in the art

lies in the necessity of maintaining objectivity in the obviousness inquiry.” *Ryko Mfg. Co. v. Nu-Star, Inc.*, 950 F.2d 714, 718 (Fed. Cir. 1991).

In addition, as discussed below, *infra* Sec. II.B, in interpreting claim language we do so from the perspective of one with ordinary skill in the art. *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc).

In determining the level of skill in the art, factors that may be considered include the educational level of the inventor, type of problems encountered in the art, the prior art solutions to those problems, the rapidity with which innovations are made, the sophistication of the technology, and the educational level of active workers in the field. *Daiichi Sankyo Co. v. Apotex, Inc.*, 501 F.3d 1254, 1256 (Fed. Cir. 2007).

Petitioner contends “[t]he **level of ordinary skill** encompassed a person having a Bachelor’s Degree in electrical engineering or a related field and three years of experience relating to audio technology or signal processing, where a higher level of education may substitute for experience.” Pet. 32–33 (citing Ex. 1002 ¶ 69).

Patent Owner contends that “a person having ordinary skill in the art (‘POSITA’) would have had technical knowledge (whether through a college degree or otherwise), along with practical experience and market awareness relating to consumer audio products including turntables.” *Id.* at 11.

Patent Owner argues that neither Petitioner nor Dr. Moon has employed proper analysis in determining the level of ordinary skill in the art because they have not analyzed the factors set forth in *Daiichi*. PO. Resp. 9–10. Patent Owner submits that its declarant, Mr. Zatkovich, has “engaged in the proper analysis and reached a different conclusion.” *Id.* at 11.

Petitioner replies that Patent Owner's proposed level "lacks clarity" because it "does not specify what the level of 'technical knowledge' is or how much knowledge a [POSITA] would have had" and because Patent Owner defines the relevant art broadly as consumer audio products while simultaneously excluding turntables relevant to DJs. Pet. Reply 8. Petitioner argues further that Patent Owner has not expressly disputed that engineering knowledge is required to produce consumer audio products. *Id.* at 9. Petitioner submits further that the prior art in this proceeding, as well as the '498 patent, reflect an appropriate level of skill in the art. *Id.*

Patent Owner replies that "it is unnecessary to decide what is a 'related field,' exactly how much 'technical knowledge' is required, and if a college degree is strictly necessary. Regardless, a POSITA would have had knowledge of the state of the art, including turntables, DJs, turntablism, and consumer audio products." PO Sur-Reply 2.

Despite the dispute between the parties in their papers, during the hearing the parties agreed that regardless of whose proposed level we adopt, it would not change the outcome in this proceeding:

JUDGE ZADO: [to counsel for Petitioner] I want to take a second. I just want to make sure we have time to touch upon the issue of the level of ordinary skill in the art because I did notice that Patent Owner proffered a different level of ordinary skill.

My question is really simple. It's just that if we were to adopt Patent Owner's level of ordinary skill in the art, what impact would that have on the analysis performed by Petitioner and Dr. Moon [Petitioner's expert]?

MR. SMITH: [counsel for Petitioner] Understood, Your Honor. I think that it probably does not have an impact. And I

am basing that on the fact that Patent Owner has not provided any specific instance where it says, under the Petitioner's definition, a person of ordinary skill would be able to do this, but under our definition, they would not be able to do it.

Or the difference between saying you have, in the Petitioner's proposed level of ordinary skill, a degree in electrical engineering or a related field and a few years of experience, or under Patent Owner's level, which is just you have some technical knowledge, where that really makes a difference, where there's any showing that one person would be able to do something or one person would not be able to do something.

I also think that at the level the claims are written with the components that are in the claims, all of these features are known. That is the phonograph, the turntable, the turntable components, AD converters, controllers, output jacks. All of these things were known in the prior art. They're all being employed for their known functions, and they're put together in practically the only logical way to do so.

And there's no real contention that a person having ordinary skill in the art would not have known how to use any of these components. So I don't really think it makes a difference, nor do I think the Patent Owner has put that at issue.

Tr. 18:7—19:10.

JUDGE ZADO: [to counsel for Patent Owner] . . . [T]he proposed level of ordinary skill in the art is not the same amongst both parties. And so I just want to know what the difference—does it matter?

If we were to adopt Patent Owner's versus Petitioner's or vice versa, I didn't see anything in the papers from Patent Owner that indicate that somehow

somebody's analysis would be correct or incorrect depending on which standard they used or there'd be some kind of difference, like it's correct under one standard but incorrect under another standard.

So can you identify anything in the record that shows that the difference between the levels would somehow change or alter the outcome in this case?

MR. BLUM: [counsel for Patent Owner] Yes, Your Honor. I do not believe the level of ordinary skill in the art matters here. We believe that it was simply too narrow to say electrical engineering although Sony did say other related degrees. We were just unclear what those other related degrees are.

It really only mattered because at one point in time, Sony indicated that they might move to exclude inMusic's expert, who does not have a EE degree but has a computer science background. They did not actually file that motion to move or exclude Mr. Zatkovich. So I don't think the level of ordinary skill in the art actually does matter for the results here.

Tr. 31:18–32:12.

Indeed, neither party identifies any testimony or argument that it alleges is in error as result of the other party's proposed level or ordinary skill in the art, nor do we discern a difference in outcome that would result were we to adopt one level versus the other.

For reasons discussed below, we adopt the assessment offered by Petitioner, which we also adopted in the Institution Decision. Inst. Dec. 18–19. However, as the parties acknowledge, whose party's level we adopt does not alter the outcome of this Decision.

The factors enumerated in *Daiichi* are neither exhaustive, nor all required. *Daiichi*, 501 F.3d at 1256 (stating that the enumerated factors

“may” be considered, and that they “include,” indicating the list of factors is non-limiting). In adopting a level of ordinary skill in the art, we address *Daiichi* factors 1) the educational level of the inventors, 2) type of problems encountered in the art, 3) the prior art solutions to those problems, 4) the rapidity with which innovations are made, 5) the sophistication of the technology, and 6) educational level of active workers in the field.

As to *Daiichi* factors 2), 3), 5), and 6) we find that the technology at issue was not particularly sophisticated, there was no technical problem to overcome, and an ordinarily skilled artisan would have had some education and experience in the electrical arts.

Claim 1 recites a conventional turntable that includes an analog-to-digital converter and controller that allows the turntable to provide digital audio output using standard computer protocol. Ex. 1001, 2:60–3:7.

The ’498 patent acknowledges that the elements recited in limitations [1a] through [1f] were well known in the art, and it is only limitation [1g] that is acknowledged as being inventive.

Specifically, the ’498 patent acknowledges that the elements recited in limitations [1a] through [1c] are conventional components of a conventional turntable. *See, e.g., id.* at 1:52–54 (stating the objects of the invention are “attained by providing a turntable with such conventional features as a revolving platter, a pivoting tonearm and analog phonocartidge”).

The ’498 patent further implicitly acknowledges that inclusion of an analog to digital converter, controller, and output using a digital signal protocol within a turntable was known in the art—i.e., limitations [1d] through [1f]. In particular, the ’498 patent discloses that a proprietary digital standard, Sony/Phillips Digital Interface (SPDIF) “has been built into some

turntables in order to provide a digital output.” *Id.* at 2:35–36. We find that inclusion of a digital output interface within a turntable suggests the turntable also includes an analog to digital converter and controller to provide a digital output to the interface.

The ’498 patent acknowledges as inventive the use of a “standard computer protocol,” such as USB or firewire, rather than, e.g., SPDIF, for the digital output—i.e., limitation [1g]. Indeed, the ’498 patent explains that although some prior art turntables provide digital output using SPDIF, “this is not a standard protocol such as USB (universal serial bus) or firewire (IEEE 1394).” *Id.* at 1:35–38.

The stated benefit of using a standard computer protocol is that it allows for “simple connection to a computer or other digital equipment.” *Id.* at 1:57–59. According to the ’498 patent, prior art solutions to provide audio from a turntable to a computer required, e.g., a computer card external to the turntable and audio conversion devices between the turntable and soundcard. *Id.* at 1:25–30.

However, in selecting a standard computer protocol to output digital output from a turntable, as opposed to using some other digital protocol such as SPDIF, the ’498 patent does not describe any technical challenge that needed to be overcome, and the lack of any detail suggests implementation would have been trivial and within the grasp of an ordinarily skilled artisan without any experimentation.

As Petitioner points out, the ’498 patent provides no guidance at all concerning how to integrate an analog-to-digital converter, controller, and standard computer protocol output into a turn table. Pet. Reply 9 (“[t]he paucity of disclosure provided in the ’498 patent demonstrates that a

PHOSITA could have implemented its teachings”); Ex. 1001, 2:18–28, 2:38–52 (stating the turntable includes an analog-to-digital converter, controller, and either USB or Firewire output port, without providing any implementation guidance or details).

We agree with Petitioner. The ’498 patent merely states that the turntable includes an analog to digital converter, controller, and USB or firewire output that results in a signal fed directly to an external computer, without further detail and without guidance as to implementation. *Id.* at 2:18–28, 2:38–52.

The lack of guidance suggests the ordinarily skilled artisan would have had the educational level necessary to integrate the above-enumerated electrical components into a turntable without any guidance, and we find this educational level would include education in the electrical arts or related field and practical experience sufficient to understand how to integrate electrical components together, e.g., analog to digital converter, controller, and digital output.

In addition, we find that the art suggests an ordinarily skilled artisan would have at least some education or experience in the field of signal processing, and in particular, with regard to analog to digital conversion of signals. The ’498 patent discloses receipt of analog electrical signals by analog to digital converter 18, whose output is digital. Ex. 1001, 2:16–19, 2:34–39. In addition, claim 1 recites “an analog to digital converter for receiving an analog audio signal from the phono cartridge” and “an output digital audio signal of music or speech representative of an audio recording from an output of said analog to digital converter, representative of said analog signal.” *Id.* at 2:64–65, 2:67–3:3. Furthermore, the parties’

arguments focus at length on what an ordinarily skilled artisan reading Spencer would have understood about analog and digital signal processing and by the phrase “digitized audio signals.” *See, e.g.*, PO Resp. 44–48; Pet. Reply 24–28; PO Sur-Reply 14–23.

Furthermore, Patent Owner has not reconciled its heavy reliance on arguments concerning the understanding of an ordinarily skilled artisan regarding the digital signal processing described in Spencer (PO Resp. 44–48; PO Sur-Reply 14–23) and its position that the appropriate level of education need not involve any engineering (PO Resp. 11; PO Sur-Reply 2). Nor has Patent Owner demonstrated that unspecified “technical knowledge (whether through a college degree or otherwise)” along with “practical experience and market awareness relating to consumer audio products including turntables” would have sufficed to develop an understanding of signal processing commensurate with the level required by Patent Owner’s arguments regarding Spencer (PO Resp. 44–48; PO Sur-Reply 14–23).

As to *Daiichi* factors 1) (level of education of the inventors) and 6) (level of education in the field), Patent Owner’s basis for not requiring an engineering degree is that “some of the inventors” of the ’498 patent did not have an electrical engineering degree. PO Resp. 11. This, alone, is not persuasive. It appears Patent Owner’s argument is based on the first factor in *Daiichi*—i.e., the educational level of the inventor. *Daiichi*, 501 F.3d at 1256. However, although this is a factor that *may* be considered, we caution that the inventor is not necessarily an ordinarily skilled artisan. *Kimberly-Clark Corp. v. Johnson & Johnson*, 745 F.2d 1437, 1454 (Fed. Cir. 1984) (explaining that the person of ordinary skill in the art is not the inventor, but rather is a hypothetical being, and that “[r]eal inventors, as a class, vary in

their capacities”). Moreover, the circumstances here are distinguishable from *Daiichi*, where the inventors were specialists in drug and ear treatments, rather than general practitioners, and the court found it relevant that the inventors had a more specialized knowledge in the art. *Daiichi*, 501 F.3d at 1256. Here, we find no evidence that the invention requires specialized knowledge, much less what that specialized knowledge would have been. In addition, in *Daiichi* the educational level of the inventors was not considered alone, in a vacuum. The court also found that others working in the same field were of the same skill level as the inventors. *Id.* Here, Patent Owner provides no evidence regarding the contribution of the inventor(s) who do not have an electrical engineering degree versus those who do, and no evidence concerning the educational level of others in the same field of art.

As to *Daiichi* factor 4) (the rapidity with which innovations are made), Patent Owner argues the “technology is simple but evolving” and an ordinarily skilled artisan would have “been aware of the market dynamics regarding turntables,” relying on Mr. Zatkovich’s testimony that an ordinarily skilled artisan “would have been aware of the pace of innovation in consumer electronics and the need for consumer products to be inexpensive and reliable, and thus would have avoided attempting to apply technology packages that were complex or not directly applicable.” PO Resp. 11 (citing Ex. 2004 ¶¶ 20–21). Not only has Mr. Zatkovich failed to cite any evidence to corroborate his testimony, he does not provide the basis for his knowledge on this topic. Ex. 2004 ¶¶ 20–21. Mr. Zatkovich’s experience includes “computer science, including telecommunications, eCommerce, cybersecurity, electronic publishing systems, user & device

authentication, software licensing, media distribution, Digital Rights Management, software copyright, and software copy protection including per-device, per-seat, and per-use licensing systems,” but he does state that he had experience in the music industry during the relevant time frame. *Id.* ¶¶ 6, 13 (stating he has experience with “audio devices,” but the previous paragraphs, i.e., 6–12, do not indicate timeframe); *see also id.* ¶¶ 7–12. Moreover, even if we were to credit Mr. Zatkovich’s testimony, Patent Owner has not explained, nor do we discern, how this would impact the stated levels of ordinary skill in the art proposed by the parties.

For the reasons discussed above, we find that an ordinarily skilled artisan would have had education in the electrical arts or related field and experience relating to signal processing or audio technology in a manner sufficient to implement analog to digital conversion of audio signals, and we adopt the assessment offered by Petitioner, which we also adopted in the Institution Decision. Inst. Dec. 18–19. However, had we adopted Patent Owner’s assessment, it would not have altered the outcome of this Decision. Even though Patent Owner argues a degree in electrical engineering would not have been necessary, Patent Owner does not dispute that an ordinarily skilled artisan could have had such a degree. *See* PO Resp. 9–11 (arguing a person having ordinary skill in the art “would have had technical knowledge (whether through a college degree or otherwise)”; Sur-Reply 2. In addition, the level of ordinary skill in the art is indicated by the references themselves, which as argued by Petitioner, demonstrate that the components in the claims were well known in the art and easily could have been integrated in the manner claimed, as we discussed above in this subsection.

B. Claim Construction

Pursuant to 37 C.F.R. § 42.100(b), we apply the claim construction standard as set forth in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). Under *Phillips*, claim terms generally are given their ordinary and customary meaning as would be understood by one with ordinary skill in the art in the context of the specification, the prosecution history, other claims, and even extrinsic evidence including expert and inventor testimony, dictionaries, and learned treatises, although extrinsic evidence is less significant than the intrinsic record. *Phillips*, 415 F.3d at 1312–17. Usually, the specification is dispositive, and it is the single best guide to the meaning of a disputed term. *Id.* at 1315.

Only terms that are in controversy need to be construed, and then only to the extent necessary to resolve the controversy. *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co. Matal*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (in the context of an *inter partes* review, applying *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)); *Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019) (“The Board is required to construe ‘only those terms . . . that are in controversy, and only to the extent necessary to resolve the controversy.’” (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

The parties propose constructions for the terms “turntable,” “controller,” and “representative.” Pet. 20–21; PO Resp. 12–15; Pet. Reply 9–12; PO Sur-Reply 3–7. However, ultimately, the parties agree each of these terms may be accorded its plain and ordinary meaning and none of these terms require express construction, as discussed below.

1. “*turntable*”

With regard to “turntable,” Petitioner points out “[t]he parties agree that the claimed device comprises the elements recited in the claims, and [Patent Owner] does not make any argument to distinguish the prior art on the basis of the definition of ‘turntable.’” Pet. Reply 9–10. Patent Owner replies that “‘turntable’ does not need to be construed because the claim itself defines a ‘structurally complete’ turntable invention” and “[b]ecause neither party has raised a dispute on the definition of ‘turntable’ affecting claim scope, the Board need not construe this term.” PO Sur-Reply 3. *See also* Tr. 5:14–16 (with regard to construction of “turntable,” counsel for Petitioner stating “it doesn’t seem like this construction is one that the Board needs to engage with because nobody is arguing that this makes a difference for the prior art”); *see id.* at 29:14–15 (counsel for Patent Owner stating “[w]e agree with Petitioner that there is no need to construe the turntable limitation”).

The ’498 patent does not expressly construe this term, and we give this term its ordinary and customary meaning. Moreover, we do not discern a controversy requiring us to interpret this term, and we determine that this term, for purposes of this Decision, does not require further, express construction. *See Vivid Techs.*, 200 F.3d at 803 (holding that only terms that are in controversy need to be construed, and “only to the extent necessary to resolve the controversy”).

2. “*controller*”

Claim 1 recites “a controller responsive to said analog to digital converter for generating an output digital audio signal of music or speech

representative of an audio recording from an output of said analog to digital converter, representative of said analog audio signal.” Ex. 1001, 2:60–3:7.

With regard to “controller,” Patent Owner first proposed a construction for this term. PO Resp. 10–11. Petitioner argues that the construction proposed by Patent Owner—“[a]n electronic device which receives a digital data stream, renders it into a specific data format, and manages the output of that formatted stream on a specific interface”—is unduly narrow and not supported by the ’498 patent disclosure. Pet. Reply 10–11; PO Resp. 13–14. Patent Owner replies that “the Board need not fully construe ‘controller’ to resolve the disputes here,” because the controller in the prior art does not perform the functions performed by the controller as recited in the claims. PO Sur-Reply 5–6. During the oral hearing, Patent Owner confirmed that because the claim language sufficiently recites the features of the “controller,” the Board need not further construe the term “controller”:

JUDGE ZADO: [to counsel for Patent Owner] I believe what I understand Patent Owner’s position to be is that we need not construe controller because the claim language itself describes what a controller does, and that Petitioner hasn’t shown that the prior art references have those features that appear in the claim.

MR. BLUM: [counsel for Patent Owner] Yes, Your Honor. That’s correct.

JUDGE ZADO: So I’m looking at what claim 1, what we’ve labeled element [1e] in the decision on institution, for example . . . [1]imitation [1e] recites, a controller responsive to said analog-to-digital converter for generating an output digital audio signal with music or speech, and it goes on. So is that what Patent

Owner is referring to, that what Petitioner failed to show, for example, would be the words that appear after the word controller?

MR. BLUM: Yes, Your Honor.

Tr. 30:3–19.

Despite Patent Owner’s confirmation at the oral hearing that the term “controller” requires no further, express construction, we nonetheless provide a determination regarding the construction proposed in Patent Owner’s Response because Patent Owner provides arguments based on its proposed construction that have not been expressly withdrawn. *See, e.g.*, PO Resp. 34 (arguing Cortellesi does not disclose “an electronic device which receives a digital data stream, renders it into a specific data format, and manages the output of that formatted stream on a specific interface”).

We agree with Petitioner that Patent Owner’s proposed construction is unduly narrow and not supported by the ’498 patent disclosure.

The ’498 patent does not expressly define the term “controller,” and we accord this term its ordinary and customary meaning in the context of, *inter alia*, the specification, the prosecution history, and other claims. *Phillips*, 415 F.3d at 1312–17.

The ’498 patent specification uses the term “controller” to describe a component that allows “a jack for a standard digital format to be incorporated into the turntable.” Ex. 1001, code (57). The controller of the disclosed embodiments are depicted as a block in Figures 1 and 2, without any indication of the internal workings or functions of the controller. *Id.* at Figs. 1 (block 20, labeled “USB controller” between analog to digital converter 18 and USB output port 22), 2 (block 26, labeled “Firewire

controller (link layer)” between analog to digital converter 18 and PHY layer 28 and Firewire output port 30). The only description of a controller in the ’498 patent specification is that the controller receives an analog to digital signal from analog to digital converter 18, the controller is within the turntable, and inclusion of the controller within the turntable results either in a USB signal or Firewire signal being generated from a turntable from a USB jack or Firewire jack, respectively, that can be fed directly to a computer for processing. *Id.* at 2:19–28, 2:40–52. With regard to USB, the ’498 patent states only:

The output of the analog to digital converter 18 is digital and is received by the USB controller 20. Both the analog to digital converter 18 and the USB controller 20 are within the turntable 10.

Ex. 1001, 2:19–23. Similarly, with regard to Firewire, the ’498 patent states only:

The output of the analog to digital converter 18 is digital and is received by the firewire controller (link layer) 26. The output of the rewire controller (link layer) 18 is received by physical (PHY) layer 28. The analog to digital converter 16, the firewire controller (link layer) 26 and the physical SHY) layer 28 are all contained within turntable 10.

Ex. 1001, 2:40–46. The ’498 patent specification does not otherwise mention a “controller.”

The specification’s use of the term “controller” provides no support for Patent Owner’s construction, but rather is consistent with the claim language, and limitation [1e] provides a sufficient description of the “controller” such that we find no need to further construe the term “controller.” *See Vivid Techs.*, 200 F.3d at 803 (holding that only terms that

are in controversy need to be construed, and “only to the extent necessary to resolve the controversy”).

3. “*representative*”

Claim 1 recites “generating an audio signal *representative* of an audio recording,” and “generating an output digital audio signal of music or speech *representative* of an audio recording from an output of said analog to digital converter, *representative* of said audio signal.” Ex. 1001, 2:62–63, 2:67–3:9 (emphases added).

With regard to “representative,” Patent Owner first proposed a construction for this term. PO Resp. 14–15. Petitioner argues that the construction proposed by Patent Owner in the Response—“[r]eproducibly indistinguishable to a listener, but in a different format from the original”—is unduly narrow, not supported by the ’498 patent disclosure, and suffers from a technical flaw, namely that digital audio signals necessarily contain less data than the original audio signals from which they are sampled and, therefore, are not reproducibly indistinguishable to a listener as a result of the data loss. Pet. Reply 11–12; PO Resp. 14–15. Petitioner proposes the plain and ordinary meaning of “representative,” which it asserts means “a first object that stands in the place of or corresponds to a second object.” Pet. Reply 12.

Patent Owner’s Sur-Reply does not address the technical flaw in its construction, nor Petitioner’s argument that it is unduly narrow. PO Sur-Reply 6–7. Moreover, Patent Owner does not provide any support in the ’498 patent disclosure that suggests a narrow definition. PO Resp. 14–15; PO Sur-Reply 6–7.

Despite the dispute between the parties discussed above, Patent Owner confirmed during the hearing that we need not expressly construe this term:

MR. BLUM: [counsel for Patent Owner] Your Honor, the last claim construction issue on slide 8 is representative limitation. And again, this also likely does not need to be construed.

The issue here is simply that, again, I think it goes to the Spencer-Cohen combination where it's our position that the audio, it's analog audio that's communicated from the turntable to the computer. It's not digital audio.

And so the issue is really not what representative means. The issue really comes down to whether it's a digital audio signal as required in the claim or whether it's an analog audio. I think it will make more sense to just explain that within the context of the obviousness arguments themselves.

Tr. 31:1–11.

Despite Patent Owner's confirmation at the oral hearing that the term "representative" requires no further, express construction, we nonetheless provide a determination regarding the construction proposed in Patent Owner's Response because Patent Owner provides arguments based on its proposed construction that have not been expressly withdrawn. *See, e.g.*, PO Resp. 40 (arguing "as properly construed, claim 1 requires that the output digital audio signal be reproducibly indistinguishable to a listener, but in a different format from, the original analog audio signal from the record, and this must be output from the turntable"); *see also, e.g., id.* at 45 (arguing signals in Spencer "are not representative of the analog audio signal of the

record because they are not reproducibly indistinguishable to a listener from the original analog audio”).

We agree with Petitioner that Patent Owner’s proposed construction is unduly narrow and not supported by the ’498 patent disclosure.

The ’498 patent does not expressly define the term “representative,” and we accord this term its ordinary and customary meaning in the context of, *inter alia*, the specification, the prosecution history, and other claims. *Phillips*, 415 F.3d at 1312–17.

In particular, Patent Owner has not provided, nor do we discern, any disclosure in the ’498 patent that supports Patent Owner’s construction. The specification, with reference to a turntable, explains twice that a phono cartridge “generates a conventional analog electrical signal, representative of the audio recording on the LP record.” Ex. 1001, 2:16–18, 2:36–38. The specification does not otherwise use the term “representative.” Nothing in this disclosure suggests a signal that is “[r]eproducibly indistinguishable to a listener, but in a different format from the original.”

Furthermore, Patent Owner’s construction leaves ambiguity because it requires a subjective assessment regarding whether a signal produces audio that is indistinguishable to a listener. Different people may have different capabilities and tolerances concerning their ability to detect whether, e.g., a digitized version of a musical piece is reproducibly indistinguishable from the original analog piece.

In addition, digital audio may exist in a variety of formats having varying levels of compression—e.g., MPEG Audio Layer 3 (MP3), formats used for audio Compact Disc (CD), formats used for Super Audio Compact Disc (SACD)—and we find it strains credulity that listeners would not be

able to distinguish between a high fidelity digital audio signal and a highly compressed digital audio signal in which significantly less data is retained, much less distinguish between highly compressed digital audio signals and analog audio signals. Moreover, nothing in the '498 patent specifies the level of compression of the digital audio output or precludes the output from being in signal formats with that have been highly compressed. We refrain from adopting a construction that would potentially include some digital audio signals (e.g., high fidelity) while excluding other digital audio signals (e.g., highly compressed), because there is no support in the '498 patent for such a restriction.

Moreover, as argued by Petitioner, a digitized version of an analog signal would be distinguishable from the original analog signal to music listeners. Pet. Reply 11 (citing Ex. 2004 ¶¶ 27–29). Even Patent Owner's expert, Mr. Zatkovich, testifies that analog music and digital music are distinguishable to music listeners. He explains that record players were a niche product at the time of invention, and that "certain listeners in that era liked the sound of vinyl better than CDs or digital or had a nostalgic feeling for the pops, crackles and hisses of vinyl." Ex. 2004 ¶ 27. He states further that, despite the niche market for vinyl records, "vinyl was seen as an outdated, inferior product as compared to CDs and digital music. Indeed, that view is largely correct. In terms of objective measures, such as distortion, noise, frequency response and dynamic range, digital is superior." *Id.* ¶ 28. He states further that the market, therefore, split in to those committed to digital "Hi-Fi" music and those who prefer the "organic" sounds of vinyl records. *Id.* ¶ 29.

Neither the '498 patent nor claim 1 is concerned with digitization techniques to ensure a digital signal is reproducibly indistinguishable from the analog signal upon which it is based, and we see no reason to import this requirement into the claims.

We, therefore, do not adopt Patent Owner's proposed construction of the term "representative." Moreover, we find the language of the claims provides sufficient context such that the term "representative" does not require further, express construction. *See Vivid Techs.*, 200 F.3d at 803 (holding that only terms that are in controversy need to be construed, and "only to the extent necessary to resolve the controversy").

C. Patentability Challenges

1. Principles of Law: Obviousness

A claim is unpatentable as obvious under 35 U.S.C. § 103 if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious to a person having ordinary skill in the art to which said subject matter pertains. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) objective evidence of nonobviousness, i.e., secondary

considerations.⁴ *See Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17–18 (1966).

2. *Relevant Prior Art*

a) *Cortellesi (Ex. 1004)*

Cortellesi is a European Patent Application, published May 10, 2000, titled “Portable Apparatus for Storing, Handling and Listening to Pieces of Music.” Ex. 1004, codes (12), (43), (54).

Cortellesi discloses “[a]n apparatus for disk jockeys to store, handle and play pieces of music in succession,” wherein the apparatus includes “means for receiving and storing the desired pieces of music in digital form, means for the digital/analog conversion of the selected pieces of music to play/listen to them, and means for allowing the disk jockey to change manually the rhythm, of the pieces of music to be played in real time.” *Id.* at Abstract.

Cortellesi explains at least two requirements of disk jockeys when playing music in venues such as discos, dancehalls, and restaurants: (1) having access to several pieces of music, and (2) being able to personalize music playback through techniques such as creating “scratching” effects with a record. *Id.* at 1:3–11. Cortellesi discloses a portable apparatus that satisfies these two requirements. *Id.* at 1:18–23, 1:40–46.

As to (1), Cortellesi’s portable apparatus includes a dedicated hard disk that stores digitally several pieces of music. *Id.* at 1:18–39; *see also id.*

⁴ The record does not present or address any objective evidence of nonobviousness.

at 5:7–11 (disclosing storing unit that receives digital pieces of music from both an analog to digital converter that receives analog audio signals and from digital audio sources).

As to (2), Cortellesi's portable apparatus includes a turntable that, in addition to including features to play conventional vinyl long playing (LP) records, includes features to play a virtual disk (VD) that a disk jockey performs "scratching" operations on. *Id.* at 1:40–46, 4:40–46. The VD is similar to a conventional vinyl LP record, except it includes metal balls positioned within that allow sensor SD to determine location/position on the VD by detecting magnetic flux created by the metal balls. *Id.* at 4:33–46. Sensor SD generates an analog signal that directly correlates with the position of the VD and further contains information about the VD's speed and rotation. *Id.* at 4:47–50. The analog signals generated by sensor SD are converted to digital signals by analog to digital converter CA/D, and processing unit EC uses the digital signals to determine "extremely precise information of position and speed" of the VD. *Id.* at 4:50–55. The position and speed information of the VD is used to synchronize the playing of manual "scratching" operations performed on the VD by the disk jockey with the playing of digital music stored in the portable apparatus's storing unit. *Id.* at 4:56–5:11.

Figures 1 and 2 of Cortellesi are block diagrams of the portable apparatus, wherein Figure 2, reproduced below, further includes depiction of a VD and sensor SD. *Id.* at 1:54–58.

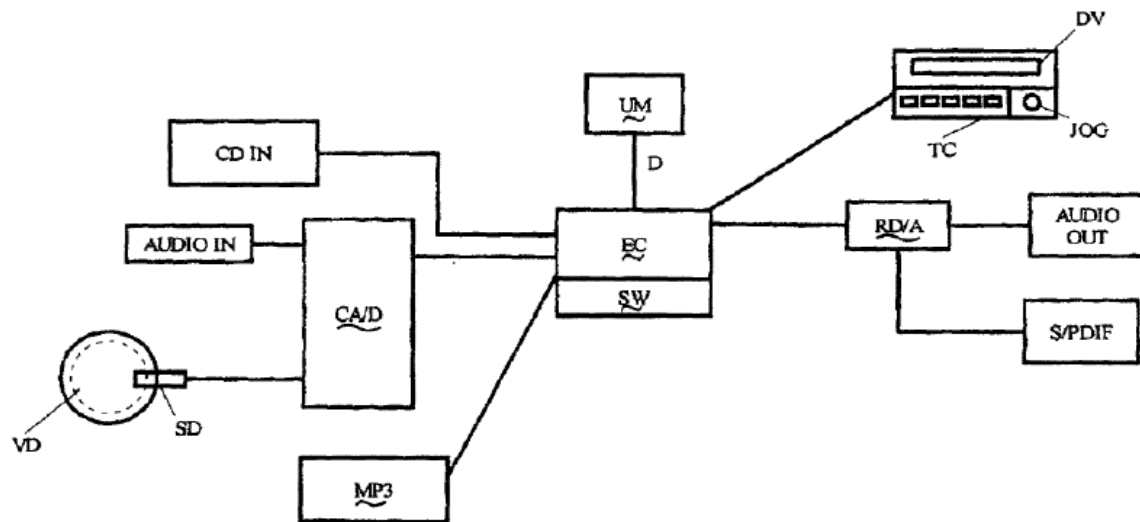


FIG. 2

Figure 2 of Cortellesi depicts a block diagram of the portable device.

Figure 2 of Cortellesi is a block diagram of the portable device, and shows analog to digital converter CA/D receiving input from sensor SD, wherein sensor SD reads information from VD. Ex. 1004, Fig. 2. As shown in Figure 2, processing unit EC receives music in digital form from either an internal or external unit, wherein the unit may be, e.g., a compact disc (CD) player. *Id.* at 2:13–18 (“the portable apparatus . . . consists of a central processing unit capable of receiving and recording the desired music in digital form through a plurality of inside and outside units”), Fig. 1 (blocks labeled “EC” and “CD”), 3:25–29 (“Processing unit EC can be connected directly to compact disk player CD”). The EC may send the digital music signals to playing unit RD/A, wherein playing unit RD/A either converts digital music signals to analog music signals and outputs such analog signals either as stereo audio signals, or outputs the digital music signals in the S/PDIF standard. *Id.* at 2:50–54. As shown in Figure 1, not reproduced

here, the portable apparatus also includes a USB-interface that “allows the apparatus to be directly connected to a personal computer for digital data processing/transmitting by software programs that improve the quality of the recorded pieces of music.” *Id.* at 4:8–13, Fig. 1 (block labeled “USB”).

Figure 4 of Cortellesi, reproduced below, illustrates the portable apparatus with a conventional turntable that further includes sensor SD for reading information from VD.

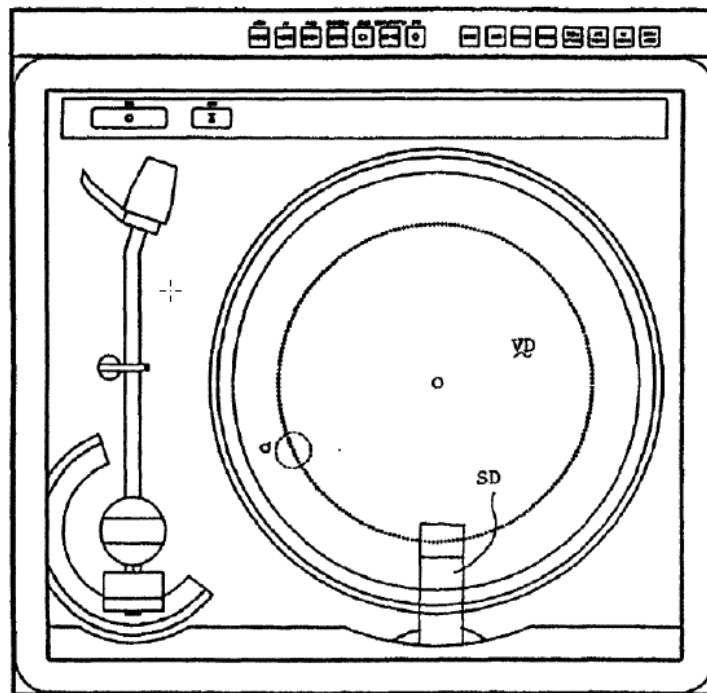


FIG. 4

Figure 4 of Cortellesi “is a top plan view of the portable apparatus provided with a record player carrying the virtual disk provided with a reading sensor.” Ex. 1004, 2:8–10.

Figure 4 of Cortellesi is a top plan view of the portable apparatus provided with a turntable that includes sensor SD. *Id.* at 2:8–10, Fig. 4. Cortellesi explains that the turntable is “of a common record player,” and includes a “pick-up arm” (i.e., tone arm). *Id.* at 4:40–43.

b) Spencer (Ex. 1005)

Spencer is a U.S. Patent Publication, published May 13, 2004, titled “Method and System for Synchronizing Information Specific to a Location on a Surface with an External Source.” Ex. 1005, codes (12), (43), (54).

With regard to vinyl (analog) records played on a turntable, analog audio output signals are based on grooves within a record surface. *Id.* ¶ 36 (explaining a stylus runs within grooves of a record, and a phono cartridge including a transducer for converting mechanical vibrations sensed by the stylus are converted into analog audio signals). An aim of Spencer is to “synchronize output signals of digital external data sources with audio from an analog record.” *Id.* ¶ 33; *see also id.* ¶ 4 (stating a goal of disk jockeys (DJs) “involves the locking or synchronization of signals (e.g., audio, video, etc.) between at least two devices”). Spencer states that one prior technique involved “playing,” on a conventional turntable, a vinyl record containing embedded timecodes, and using the timecode data to synchronize the analog audio of the vinyl record with an external digital sound source such as a CD player. *Id.* ¶ 5. Spencer explains a downside to using timecodes embedded on vinyl records is that timecodes may wear over time. *Id.* Spencer seeks to overcome this shortcoming by, instead of using timecodes for synchronization, devising a turntable that tracks dimensional information of stylus location within a groove of the vinyl record. *Id.* ¶¶ 7, 10.

Spencer discloses a system and method for determining the position/location of a stylus needle on a record surface and using such information to synchronize the analog audio waveform corresponding to that position/location with a digital audio waveform. *Id.* ¶ 26. Specifically, Spencer discloses “controller unit 100, e.g., a turntable unit” that includes

sensors that aid in determining the location of a stylus or needle within a groove of a rotating record. *Id.* at Abstract, ¶ 30. Spencer's turntable (i.e., controller unit 100) includes features of a conventional turntable, including turntable platter 122, tone arm assembly 120 including tone arm 124, and phono cartridge 122. *Id.* ¶¶ 33–34, 36, Fig. 2. Spencer's turntable further includes tone arm encoder 128 that detects the position of tone arm 124 via “well known optical, magnetic, or mechanical methods” and sends, via output ports 102, signals indicating the position of tone arm 124 to external data processor 200. *Id.* ¶¶ 37–39.

In order to synchronize an external digital audio signal with “an audio waveform specific to a predetermined location on a record,” Spencer matches stylus/needle location with a portion of a sampled audio waveform. *Id.* ¶ 26. As noted above, information useful in determining stylus/needle location is generated by detecting the position of a tone arm relative to a tone arm encoder:

A tone arm encoder 128 may be arranged on the controller unit 100 within an operable proximity of the tone arm 124 when the stylus 123 is arranged within the groove of the record. Accordingly, the position of the tone arm 124, relative to the tone arm encoder 128, may be detected by the tone arm encoder 128 via well known optical, magnetic, or mechanical methods.

Ex. 1005 ¶ 37.

The sampled audio waveform is generated by using standard techniques for generating an analog audio signal using a record player and sampling such signal. *Id.* ¶ 36. In particular, Spencer discloses “cartridge 122 generally includes at least one transducer for converting mechanical vibrations sensed by the stylus 123 into analog electrical

signals.” Ex. 1005 ¶ 36. Spencer further discloses that these analog audio signals are communicated to “data processor unit 200 for sampling.” *Id.*

c) Cohen (Ex. 1006)

Cohen is a U.S. Patent Application Publication, published November 6, 2003, titled “Phonograph Turntable with Midi Output.” Ex. 1006, codes (12), (43), (54).

Cohen discloses “a turntable assembly which includes a rotary turntable platter, a phonographic cartridge, and a tonearm for impinging the phonographic cartridge against a record on the rotary turntable platter.” *Id.* Abstract. Cohen’s turntable assembly 10 “includes typical turntable components such as platter 15 (see FIG. 2) upon which record 12 is placed, a motor to drive the platter at 33¹/₃, rpm, a phonographic cartridge/needle 17 which is inserted into the spiral groove of record 12 during playback, and a tonearm 19 for supporting the phonographic cartridge/needle.” *Id.* ¶ 15. Cohen’s turntable assembly further includes analog-to-digital converter 18 for converting analog signals into a digital data stream. *Id.* ¶ 16. The digital data stream is received by a microprocessor or digital signal processor (DSP) that extracts information in order to produce a Musical Instrument Digital Interface (MIDI) output.

In particular, Cohen’s turntable may play both (1) conventional analog vinyl records with music encoded thereon, and (2) records encoded with a MIDI audio timecode encoded thereon. *Id.* ¶¶ 14, 15, 18. As to (2), Cohen discloses the groove of the record, “rather than having a musical performance in analog format, has a MIDI audio time code encoded therein in analog format.” *Id.* ¶ 14. When playing such record, the turntable

“generates an analog output from record 12 which is largely conventional, except that the resulting analog signal from record 12 includes an analog MIDI timecode.” *Id.* ¶ 15. When playing both types of records, (1) and (2), the analog output is received by Recording Industry Association of America (RIAA) preamplifier, because amplification is required due to the low output levels of the phonographic cartridge needle. *Id.* The amplified analog signal is received by analog-to-digital converter 18 and converted to a digital data stream that is received by microprocessor or DSP 20. *Id.* ¶ 16. In the context of (2), microprocessor or DSP 20 generates a MIDI time code for output. *Id.* In the context of (1), microprocessor or DSP 20 “can be configured to recognize when a conventional analog record, typically including a musical or other audio performance and not including any encoded MIDI information, is being played by turntable 14.” *Id.* ¶ 18. In such instance, “[t]he resulting conventional MIDI output is then output from second MIDI output 24.” *Id.*

d) Georges (Ex. 1013)

Georges is a U.S. Patent Application Publication, published July 17, 2003, titled “Systems and Methods for Creating, Modifying, Interacting with and Playing Musical Compositions.” Ex. 1013, codes (12), (43), (54).

Georges relates to “systems and methods for creating, modifying, interacting with and playing music, and more particularly to systems and methods employing a top-down and interactive composition process.” *Id.* ¶ 1. Georges discloses providing “user interface features . . . that desirably facilitate the interactive generation of music.” *Id.* ¶ 60. The embodiments of Georges “are primarily focused on one example of a handheld, entry-level

type of device, herein called a ‘Player.’” *Id.* Georges discloses, however, that rather than being limited to a hardware Player, the systems and methods relating to musical compositions may be implemented with either a software based approach or a hybrid hardware and software based approach. *Id.*

¶ 311. Using the hybrid approach, a hybrid DSP module may be plugged into a “high speed bus (e.g., IEEE 1394 [firewire], or USB, etc.) of a personal computing system.” *Id.* In such an implementation, certain functionality can be performed by the personal computing system, while other functionality is handled by a DSP located on a hardware module. *Id.*

D. Obviousness over Cortellesi

Petitioner asserts unpatentability under 35 U.S.C. § 103 of claims 1, 2, and 4–6 as obvious over Cortellesi. Pet. 21–50.

We first address claim 1—the only independent claim. Discussed further below, Patent Owner argues that Cortellesi does not teach limitations [1d], [1e], [1f], and [1g]. PO Resp. 20–36. Patent Owner does not otherwise provide arguments or evidence regarding this ground of unpatentability.

We have considered Petitioner’s evidence and arguments, including the relevant testimony of Dr. Moon, as well as the evidence and arguments presented by Patent Owner, including the relevant testimony of Mr. Zatkovich. Based on our review of the record, we determine Petitioner has demonstrated by a preponderance of the evidence that claim 1 is unpatentable under 35 U.S.C. § 103 as obvious over Cortellesi.

1. Preamble [1a] and limitations [1b] and [1c]

Petitioner provides evidence and arguments that Cortellesi teaches:

[1a] A turntable including:

[1b] a rotatable platter;

[1c] a tonearm for receiving a phono cartridge for generating an analog audio signal representative of an audio analog recording.

Pet. 34–40.

Patent Owner does not contest Petitioner’s evidence and arguments with respect to these limitations. *See* PO Resp. 20–36.

We highlight the following; however, these highlights should not be interpreted as limiting our findings and conclusions.

Petitioner argues, and Patent Owner does not dispute, that limitations [1b] and [1c] recite features of turntables that were conventional and well-known in the relevant time frame. Pet. 9–12, 34–40; Ex. 1002 ¶¶ 28–29. We agree these features were conventional and well known in the relevant time frame. *See, e.g.*, Ex. 1001, 1:52–53 (acknowledging a “revolving platter, a pivoting tonearm and an analog phonocartridge” were “conventional features” of a turntable). We also agree with Petitioner that a skilled artisan would have understood Cortellesi’s apparatus as having these features. Pet. 25–32; Ex. 1002 ¶¶ 52–54 (citing Ex. 1004, 4:40–46; Ex. 1010, Abstract, 15:24–28; Ex. 1011, Fig. 11, 13:55–14:15, Fig. 3B, 12:48–56, 20:27–38; Ex. 1006 ¶¶ 8, 15).

Cortellesi relates to “the professional playing of records” and discloses a “turntable of a common record player” that plays “a common long playing record (L.P.).” Ex. 1004, 4:40–42; Pet. 34 (citing Ex. 1004, 1:30–34; Ex. 1002 ¶ 76). Petitioner contends that a turntable of a common record player that plays common LP’s, as disclosed in Cortellesi, would have been understood as including a rotatable platter in order to rotate the

LP and a tonearm with a phono cartridge as recited in claim 1 in order to generate analog audio output from the grooves of the LP. Pet. 36–40 (citing Ex. 1002 ¶¶ 78–79).

Figure 4 of Cortellesi, reproduced below, supports Petitioner’s position.

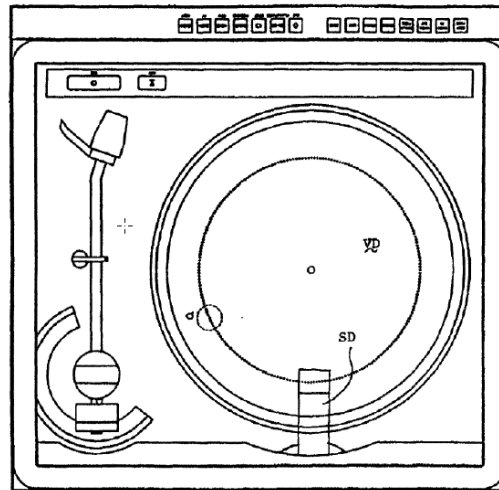


FIG. 4

Figure 4 of Cortellesi illustrates a top plan view of an apparatus provided with a record player. Ex. 1004, 2:8–10.

Ex. 1004, Fig. 2. As shown in Figure 4, the record player includes a turntable that includes a rotatable platter and tone arm for receiving a phono cartridge as recited in claim 1. Petitioner provides an annotated copy of Figure 4, reproduced below, identifying the rotatable platter, tonearm, and phono cartridge.

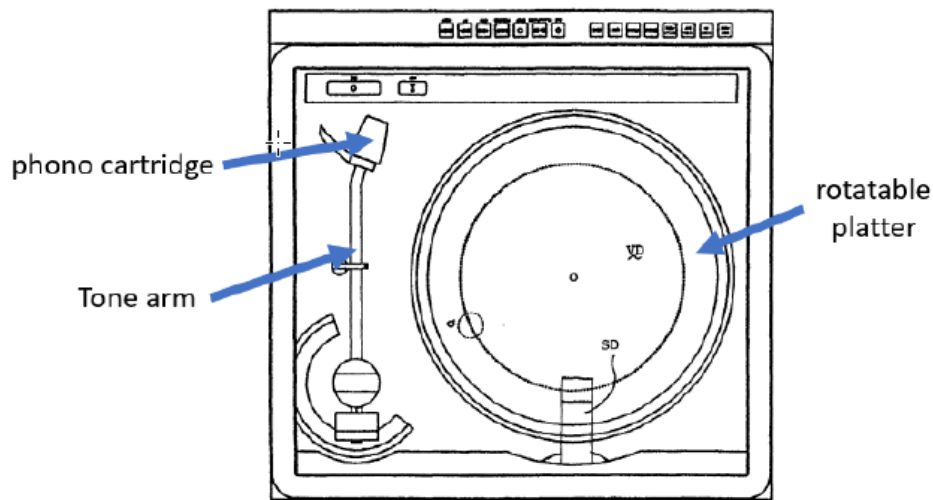


FIG. 4

This figure from the Petition is a copy of Cortellesi's Figure 4, with annotations by Petitioner in blue.

Pet. 26.

We note that Cortellesi's record player also includes additional features not included in conventional turntables—e.g., sensor SD for reading information off a virtual disk VD. Ex. 1004, 4:33–55. However, this neither detracts from, nor negates, Cortellesi's teaching of a turntable that includes the features recited in limitations [1b] and [1c].

Having reviewed the record in this proceeding, we determine that Petitioner has demonstrated sufficiently that Cortellesi meets limitations [1a], [1b], and [1c].

2. Limitation [1d]

Petitioner provides evidence and arguments that Cortellesi teaches:

[1d] an analog to digital converter for receiving an analog audio signal from the phone cartridge.

Pet. 40–41.

We highlight the following; however, these highlights should not be interpreted as limiting our findings and conclusions.

Cortellesi discloses that its apparatus includes converter CA/D. Figure 1 of Cortellesi shows that CA/D receives analog input through left and right channels L and R. Ex. 1004, Fig. 1. Cortellesi discloses expressly that CA/D is a converter and stores “directly from audio analogue sources (vinyl records, tapes, radio, live).” *Id.* at 2:33–36.

Petitioner argues Cortellesi’s CA/D can receive an analog audio signal from the phono cartridge, but implicitly acknowledges this is not explicitly disclosed. Pet. 40. Petitioner asserts, however, that it would have been obvious for CA/D to receive an analog audio signal from the phono cartridge. Pet. 40–41 (citing Ex. 1002 ¶ 84); Pet. 25–32. Indeed, Cortellesi discloses an analog to digital converter “CA/D for storing directly from audio analogue sources (vinyl records, tapes, radio, live).” Ex. 1004, 2:33–35. In light of this disclosure that CA/D directly receives analog audio signals from the playing of vinyl records, it would have been obvious one of the sources playing the vinyl records would have been Cortellesi’s turntable. Pet. 25–26.

Specifically, Cortellesi teaches a portable apparatus that includes a turntable that plays common records, wherein the apparatus can store a digitized collection of LP’s, thereby avoiding the need to transport numerous LP’s to music venues. Ex. 1004, 2:18–23, 2:30–36, 4:40–42. The digitization process, Petitioner argues, would have been one of the features of Cortellesi’s turntable, as Cortellesi explicitly teaches a turntable that plays common records (Ex. 1004, 4:40–41, Fig. 4), and the turntable having CA/D

for converting audio signals from vinyl records to digital and storing such recorded music (Ex. 1004, 2:33–36). Pet. 26–31.

Despite Patent Owner’s assertion that “Cortellesi Does Not Disclose or Suggest an Analog to Digital Converter” (PO Resp. 20), Patent Owner provides no evidence that Cortellesi’s CA/D is not “an analog to digital converter for receiving an analog audio signal from the phone cartridge,” as recited in claim 1. See PO Resp. 20–36. It appears Patent Owner’s argument is not that Cortellesi’s CA/D is not “an analog to digital converter” as recited in limitation [1d], but rather that Cortellesi’s CA/D is not “included within [the] turntable,” as recited in limitation [1f]. See, e.g., *id.* at 22 (“any record player disclosed by Cortellesi is located outside of the apparatus containing Cortellesi’s analog-to-digital converter,” and thus Cortellesi fails to disclose or suggest an analog to digital converter “included within [the] turntable”). We address Patent Owner’s arguments regarding whether Cortellesi’s CA/D is within the turntable in our discussion of limitation [1f] below, *infra* Sec. II.D.4.

Having reviewed the record in this proceeding, we determine that Petitioner has demonstrated sufficiently that Cortellesi meets limitation [1d].

3. Limitation [1e]

Petitioner provides evidence and arguments that Cortellesi teaches:

[1e] a controller responsive to said analog digital converter for generating an output digital audio signal of music or speech representative of an audio recording from an output of said analog to digital converter, representative of said analog audio signal.

Pet. 41–45.

We highlight the following; however, these highlights should not be interpreted as limiting our findings and conclusions.

Petitioner identifies Cortellesi's central processing unit EC as teaching the claimed "controller." Pet. 41. Petitioner argues Cortellesi's EC is responsive to the analog-to-digital converter (i.e., Cortellesi's CA/D), and outputs digital audio of music or speech representative of the audio recording (i.e., vinyl record) output from CA/D. *Id.* at 41–45. For reasons discussed above with regard to limitation [1d], *supra* Sec. II.D.2, we are sufficiently persuaded that Cortellesi's CA/D receives analog audio signals representative of an audio recording and teaches converting such analog signals into digital—i.e., Cortellesi teaches passing analog audio output of a common vinyl record through analog to digital converter CA/D.

Furthermore, for reasons discussed below in this subsection, the evidence and argument show sufficiently that Cortellesi's EC receives audio signals and generates an output audio signal of music or speech, wherein the output audio signal is representative of an audio recording from an output of said analog to digital converter, representative of the audio signal from a common vinyl record—i.e., Cortellesi teaches that the analog audio output of a common vinyl record, which is converted to a digital audio signal by analog to digital converter CA/D, is then sent to EC, wherein EC generates a digital output audio signal representative of the audio signal from the common vinyl record.

As Petitioner points out, Cortellesi's EC is responsible for generating output audio signals. Pet. 42. Specifically, Cortellesi's EC "comprise[s] a microprocessor CPU," and the EC is responsible for "processing and delivering data from several inside and/or outside units by digital

connections” and “executes a program for processing the digital information of the apparatus.” Ex. 1004, 2:25–33.

Patent Owner argues Cortellesi’s EC does not “generat[e] an output digital audio signal of music or speech representative of an audio recording from an output of said analog to digital converter,” as recited in limitation [1e]. PO Resp. 34–35. Patent Owner states that the “only generation of an output digital audio signal discussed in Cortellesi is in conjunction with its ‘playing unit, RD/A,’” and that the signals output from EC to RD/A are raw data, not “output digital audio signals,” as required by limitation [1d]. *Id.* It is not contested that RD/A generates output audio signals—namely, it produces either analog audio output in stereo or digital audio output in the PDIF format. Ex. 1004, 2:50–54, Fig. 1. However, this does not mean RD/A is the only component that generates digital audio output, and that EC does not also generate digital audio output. Patent Owner made a similar argument in the Preliminary Response. Prelim. Resp. 17. With regard to this argument, we explained in the Institution Decision,

Petitioner’s theory of unpatentability does not depend on the output generated by RD/A. Claim 1 explicitly recites, in limitation [1g], that the output digital audio signal “uses standard computer protocol,” which according to the Specification may include the USB protocol. As such, Petitioner relies on the digital audio output from EC’s USB port to a computer (Pet. 46–48), which teaches EC generating digital output audio (see Sec. II.F.5, *infra*).

Inst. Dec. 35.

In pertinent part, Petitioner argues a theory of unpatentability that does not depend on the output generated by RD/A. Pet. 46–48. Limitation [1g] explicitly recites that the output digital audio signal “uses standard

computer protocol,” which according to the specification may include the USB protocol. Ex. 1001, 1:37–38. As such, Petitioner relies on the digital audio output from EC’s USB port to a computer (Pet. 46–48), which teaches EC generating digital output audio. *See infra* Sec. II.D.5.

Specifically, Cortellesi teaches communicating digital output audio through a USB interface of EC. Figure 1 of Cortellesi shows EC’s USB output, and Cortellesi teaches that its apparatus includes:

“several interfaces to the outside such as . . . [a] USB-interface that allows the apparatus to be directly connected to a personal computer for digital data processing/transmitting by software programs that improve the quality of the recorded pieces of music (removal of ground noise/interferences, digital mixing).”

Ex. 1004, 3:44–4:14. “[R]ecorded pieces of music” sent over USB to a computer to remove noise and for digital mixing, combined with the USB output being directly from EC as shown in Cortellesi’s Fig. 1, suggests EC generates and outputs digital output audio signals of music or speech representative of an audio recording from an output of CA/D.

In addition, Cortellesi includes hard-disk storage to “store digitally several pieces of music.” Ex. 1004, 1:20–22 (*cited in* Petition 44). As Petitioner argues, the “storage is accomplished by the CPU EC,” and a skilled artisan would have understood the in order for the CPU EC to store music digitally on a hard drive, it would have necessarily output digital audio signals to the hard drive. Pet. 44 (citing Ex. 1002 ¶ 92); *see also* Pet. Reply 22–23 (arguing digital storage of music is accomplished by EC) (citing Ex. 1004, 5:16–19; Ex. 1002 ¶ 92).

Patent Owner does not address the “recorded pieces of music” output via Cortellesi’s USB port from Cortellesi’s EC, other than stating that Petitioner, “never explains, with respect to its USB allegations, how Cortellesi’s CPU EC ‘generate[s] an output digital audio signal of music or speech representative of an audio recording’ or how that signal uses a ‘standard computer protocol,’ as recited in Claim 1.” PO Sur-Reply 13. This argument does not undermine Petitioner’s position.

As we discussed above with regard to the level of ordinary skill in the art, *supra* Sec. II.A, we find a skilled artisan would not have needed the explanation Patent Owner argues Cortellesi lacks. The ’498 patent disclosure provides no explanation regarding how the “controller” “‘generate[s] an output digital audio signal of music or speech representative of an audio recording’ or how that signal uses a ‘standard computer protocol,’ as recited in Claim 1.” With regard to USB, the ’498 patent states only:

The output of the analog to digital converter 18 is digital and is received by the USB controller 20. Both the analog to digital converter 18 and the USB controller 20 are within the turntable 10.

Ex. 1001, 2:19–23. Similarly, with regard to firewire, the ’498 patent states only:

The output of the analog to digital converter 18 is digital and is received by the firewire controller(link layer) 26. The output of the rewire controller (link layer) 18 is received by physical (PHY) layer 28. The analog to digital converter 16, the firewire controller (link layer) 26 and the physical SHY) layer 28 are all contained within turntable 10.

Ex. 1001, 2:40–46. The ’498 patent specification does not otherwise mention a “controller.” Therefore, as we discussed with regard to the level

of ordinary skill in the art, *supra* Sec. II.A, as evinced at least by the '498 disclosure, in implementing the claimed controller an ordinarily skilled artisan would not have required an explanation in Cortellesi as argued by Patent Owner.

As to whether EC necessarily generates and outputs digital audio signals *sent to* hard disk storage (Pet. 44), Patent Owner provides no response. Patent Owner addresses a different issue, namely whether EC “generates” digital audio signals when it retrieves digital music *from* storage (PO Resp. 35).

We note that Patent Owner also argues that Cortellesi’s EC is not a “controller” under its proposed construction of this term. PO Resp. 34. However, as we discussed above with regard to claim construction, *supra* Sec. II.B.2, the parties ultimately agree limitation [1e] sufficiently recites the controller’s features, and we determine that further, express, construction is not required. Our analysis above in this subsection addresses the full recitation of limitation [1e] including Patent Owner’s associated arguments (*e.g.*, PO Resp. 34–36; PO Sur-Reply 13), and we have considered all of Patent Owner’s evidence and arguments regarding the full recitation in rendering this Decision.

Having reviewed the record in this proceeding, we determine that Petitioner has demonstrated sufficiently that Cortellesi meets limitation [1e].

4. Limitation [1f]

Petitioner provides evidence and arguments that Cortellesi teaches: [1f] wherein said analog to digital converter and said controller are included within said turntable.

Pet. 26–32, 45–46.

We highlight the following; however, these highlights should not be interpreted as limiting our findings and conclusions.

a) Whether Cortellesi teaches including the CA/D and EC within a turntable

The following evidence supports Petitioner’s position that Cortellesi teaches its CA/D and EC are included within a turntable.

Cortellesi states that disk jockeys (DJs) resort to “expensive, sophisticated, cumbersome apparatus including juke-box of large playing capacity that does not allow personalized handling of the pieces of music in succession or the so-called scratching with the purpose of personalizing the played music.” Ex. 1004, 1:12–17. Cortellesi provides that the “invention” overcomes these problems “by providing a cheap, reliable, portable electronic *apparatus* using a dedicated hard-disk where it is possible to store digitally several pieces of music and to play them without the need of having the original musical supports or records.” *Id.* 1:17–23 (emphasis added).

Cortellesi describes Figures 1, 2, and 4 as follows:

Fig. 1 is a first block diagram of the storing, playing *apparatus*;

Fig. 2 is a block diagram of a storing, playing *apparatus* further provided with a virtual disk;

* * *

Fig. 4 is a top plan view of a first embodiment of the *apparatus* provided with a record player carrying the virtual disk provided with a reading sensor.

Id. at 1:54–1:57, 2:8–10.

With reference to Figure 1 Cortellesi discloses that “the *apparatus* of the invention includes: a central processing unit EC . . . [and] a

digital/analog converter CA/D for storing directly from analog sources (Vinyl records, tapes, radio, live).” *Id.* at 2:12–36 (emphasis added). Accordingly, Cortellesi teaches CA/D and EC are included within the apparatus.

The parties do not appear to dispute that the “apparatus,” such as that show in Figure 1, includes CA/D and EC. The controversy between the parties is whether the “record player carrying the virtual disk” in Figure 4 is reasonably understood as the “apparatus,” such that, e.g., the record player in Figure 4 includes CA/D and EC. Pet. 45–46; PO Resp. 21–28; Pet. Reply 12–17; PO Sur-Reply 8–11.

Petitioner argues that the “apparatus” shown in Figure 4 (which Petitioner argues persuasively is a turntable⁵) is an embodiment of the “apparatus” of Cortellesi’s invention (i.e., the “[p]ortable apparatus” according to the title of the patent), and like the “apparatus” illustrated in Figure 1 and Figure 2, a skilled artisan would have understood the “apparatus” shown in in Figure 4 includes CA/D and EC. Pet. 45–46.

Cortellesi’s referral to Figures 1, 2, and 4 as showing the “apparatus” supports Petitioner’s position that CA/D and EC shown in Figures 1 and 2 are included in the turntable shown in Figure 4. Moreover, Cortellesi’s apparatus is a portable apparatus that disk jockeys can take with them to music venues (Ex. 1004, 1:3–23), wherein disk jockeys can use the apparatus to both play music and perform scratching operations on a virtual disk played on the turntable portion of the apparatus (*id.* at 1:40–46). This

⁵ Figure 4 of Cortellesi shows the apparatus as being a record player including a rotatable platter and tonearm with a phono cartridge. Ex. 1004, Fig. 4; Pet. 34–40.

indicates the apparatus is a turntable (because it plays virtual disks) that includes CA/D and EC (so it can play music). Pet. 45–46.

Patent Owner argues that Cortellesi neither teaches nor suggests including CA/D and EC in a turntable. PO Resp. 20–36; PO Sur-Reply 8–11.

One set of arguments by Patent Owner essentially relates to whether the turntable in Figure 4 of Cortellesi—which Cortellesi refers to as “a top plan view of a first embodiment of the *apparatus*”—would have been understood as being the invention of Cortellesi, i.e., its “portable *apparatus*” (and, therefore, would have included CA/D and EC). PO Resp. 21–28.

Because Cortellesi states Figure 4 it is a top plan view of a first embodiment of the apparatus provided with a record player (Ex. 1004, 2:8–10), we are persuaded that a reasonable interpretation of the turntable shown in Figure 4 is that it is an embodiment of the portable apparatus of Cortellesi’s invention (and therefore includes CA/D and EC). Cortellesi does not state Figure 4 is a view of a record player used in conjunction with, or connected to, the apparatus (Patent Owner’s interpretation). Rather, it states expressly that Figure 4 *is* a view of an embodiment of *the apparatus*. Patent Owner does not provide, nor do we discern, a credible alternative explanation as to what this express disclosure means. See PO Resp. 21–28. Instead, Patent Owner relies on extrinsic evidence and alternative disclosures within Cortellesi to argue Cortellesi does not mean what it actually says with regard to Figure 4.

For example, Patent Owner relies on a New York Times article about a product unrelated to Cortellesi—a stand-alone analog-to-digital converter that converted analog audio signals from a record player to digital audio

signals that could be communicated over USB to a computer—to argue an analog-to-digital converter would not have been included in Cortellesi’s record player. PO Resp. 24 (citing Ex. 1007). The existence of a stand-alone product fails to persuade us to interpret Cortellesi differently. At best the New York Times article shows a device useful for home users to convert vinyl records to digital files using their *existing* record player, and is not informative either way concerning what a skilled artisan reading Cortellesi’s disclosure of its apparatus would have understood. Moreover, we discern no reason why the New York Times article would have led to a skilled artisan to understand that Cortellesi does not mean what it says, namely that the turntable in Figure 4 is a top plan view of *the apparatus*.

Patent Owner also argues that if we accept Petitioner’s interpretation that Figure 4’s turntable is the apparatus, we also would have to interpret all audio components shown in Figures 1 and 2 of Cortellesi as being included in the apparatus, which would have led to an “all-in-one mega apparatus,” and that such an apparatus would have been contrary to the purpose of Cortellesi of allowing playback of digitally stored music “without having the need of having the original supports or records.” PO Resp. 23–24.

First, we disagree with Patent Owner that interpreting Figure 4’s record player as the apparatus would have led to an all-in-one mega apparatus. Figures 1, 2, and 4 show different embodiments of the apparatus, but neither suggest nor require an apparatus that includes every element of every embodiment.

For example, Figure 1 shows the CD player (labeled “CD”), therefore suggesting that in one embodiment the CD player is part of the apparatus. Claim 14 of Cortellesi is consistent with this embodiment. Ex. 1004,

claim 14 (claiming the apparatus according to the preceding claims, wherein the apparatus is provided with a compact disk player). On the other hand, Figure 2 shows “CD IN,” but not “CD,” therefore suggesting an embodiment in which the apparatus does not include the CD player, but may be connected to one. Claim 7 of Cortellesi is consistent with this embodiment. *Id.* at claim 7 (claiming the apparatus according to the preceding claims, wherein the apparatus can be connected to a compact disk player). Therefore, by Cortellesi’s express disclosure, inclusion of a CD player in the apparatus is optional.

Figure 4, on the other hand, shows a record player and states that it is a “top plan view of a first embodiment of the apparatus,” suggesting that in an embodiment the apparatus is housed within the record player housing. *Id.* at 2:8–10.

Accordingly, Figures 1, 2, and 4 represent different embodiments of the apparatus, and we discern no reason that interpreting Figure 4 as the inventive portable apparatus would necessarily result in an all-in-one mega apparatus (e.g., why the Figure 4 embodiment would require a CD player, as Patent Owner argues). That said, Cortellesi expressly provides (with regard to Figure 4) an apparatus that includes a record player, and Petitioner provides reasons for the apparatus to include a record player.

In pertinent part, as Petitioner points out, unlike other components in Cortellesi such as the CD player, which are not required to be incorporated into the apparatus, Cortellesi’s virtual disk functionality requires Cortellesi to have a record player. Pet. Reply 16, 18, 20. In addition, Cortellesi provides instances in which inclusion of a record player in the apparatus would have been desirable in order to use the virtual disk functionality. *Id.*

at 18 (citing 4:23–33). Furthermore, Cortellesi expressly discloses embodiments that include a record player that is modified for use with virtual disks. For example, in describing the invention, Cortellesi states “another peculiar aspect of the apparatus further includes a virtual disk that allows the disk jockeys to synchronize perfectly a listened piece of music with the following one performed automatically the same operations (scratching) as those performed today on the records placed on the turntables of the record players located in the console.” Ex. 1004, 1:40–46.

Accordingly, any embodiment of Cortellesi that includes the virtual disk functionality requires a record player adapted to read certain information from a virtual disk (*see, e.g.*, Ex. 1004, 4:23–25 (“the invention provides . . . the use of a virtual disk to be placed on the turntable of a common record player”); *see also, e.g., id.* at 4:56–5:3 (“software uses information relative to position and speed of disk VD and reads digital data of the piece of music which should be actually played . . . so that perfect synchronization with the manual operations of the disk jockey on said virtual disk VD is carried out”); *see also* Pet. Reply 15–16 (“a record player is **required** to use Cortellesi’s virtual disk functionality” and in a configuration in which the record player is part of the apparatus “a DJ using Cortellesi’s apparatus need not bring his or her . . . supporting records but would still require a record player to use the virtual disk”)). Given the need for an adapted record player to use Cortellesi’s virtual disk functionality, we agree with Petitioner that Cortellesi provides reasons for an embodiment in which the record player is part of the apparatus. Pet. Reply 14–16.

Inclusion of the record player in the apparatus leaves only the question of whether the CA/D and EC are actually inside or outside the

“record player.” However, as we discussed above, Cortellesi essentially states, with regard to Figure 4, that the record player is the apparatus, and for reasons discussed above we are persuaded that Cortellesi sufficiently teaches or suggests CA/D and EC being within a record player. Ex. 1004 ¶ 3 (“Fig. 4 is a top plan view of a first embodiment of the apparatus”).

In reaching our findings, we considered Patent Owner’s additional argument that the record player shown in Figure 4 of Cortellesi cannot be the inventive portable “apparatus” because the Figure does not prominently show a “display (‘DV’) or knob (‘MA’) or (‘JOG’), as shown in Figure 2. Nor does it have many of the other components described in Figures 1 and 2.” PO Resp. 26–27 (citation omitted). This argument is unavailing. Figure 4 is a “top plan view,” and therefore does not purport to show every feature of the apparatus present in every single possible view of the apparatus, including knobs and/or the internal components of the apparatus. Nor do we discern any basis in the disclosure of Cortellesi to conclude that any feature not explicitly drawn in Figure 4 (such as internal components like CA/D and EC) necessarily is not included in the “apparatus” of Figure 4. Pet. Reply 15 (citing Ex. 2007, 775–13, 76:22–24; Ex. 1029, 54:8–21, 55:18–23) (“Figure 4 is . . . a ‘top plan view,’ the intent of which is clearly not to depict all components of the apparatus, including those on the side of and inside the housing.”). Rather, upon considering Cortellesi as a whole, including the teachings discussed above in the subsection, we are persuaded that the turntable shown in Figure 4 would have been understood as the portable apparatus described in Cortellesi as its invention, and therefore would have been understood as including CA/D and EC for reasons discussed above in the subsection.

We note further that Patent Owner has not provided a credible theory as to what “apparatus” Figure 4 could be referring to other than the portable apparatus of Cortellesi’s invention. Cortellesi does not use the term apparatus in any other way. Although Petitioner bears the burden of persuasion, Patent Owner’s argument that the description of Figure 4 as a “top plan view of a first embodiment of the apparatus” does not refer to the “portable apparatus” of Cortellesi’s invention strains credulity.

Having reviewed the record in this proceeding, we determine that Petitioner has demonstrated sufficiently that Cortellesi teaches including the CA/D and EC within a turntable.

b) Whether it would have been obvious to include CA/D and EC in the turntable

Assuming arguendo that Cortellesi’s description of Figure 4 as a “top plan view of an embodiment of the apparatus” is not intended to invoke the “apparatus” of the invention of Cortellesi (i.e., the “cheap, reliable, portable electronic apparatus using a dedicated hard-disk” that includes a “recording function that makes it possible to record pieces of music” from “record players” and which further includes a “virtual disk which allows disk jockeys to synchronize perfectly a listened to piece of music,” and whose further “features and advantages” are “readily apparent with reference to the . . . drawings which show some preferred embodiments of the invention” (Ex. 1004, 1:19–23, 1:30–34, 1:40–42, 1:47–51))—but rather refers to some other apparatus—Petitioner argues it would have been obvious nonetheless to include CA/D and EC in the “apparatus” (i.e., record player). Pet. 46, 25–32.

We do not repeat all of Petitioner’s arguments here. However, we highlight the following, but no inference should be drawn regarding the arguments not highlighted here.

The virtual disk feature of Cortellesi—described as a characteristic of the apparatus—requires equipment for reading a virtual disk. Ex. 1004, 1:40–46, 4:40–50. This is not in dispute. The only disclosure of such equipment is a “common record player” that includes components necessary for playing common records (i.e., phonocartidge, tonearm, and rotatable platter), as well as components specific to reading a virtual disk (i.e., “directional sensor of magnetic flux SD which is integral with the record player”). *Id.* at 4:40–46. As argued by Petitioner, and we agree, “it is obvious that [the record player shown in] Fig. 4 is not provided *exclusively* for use with the virtual disk.” Pet. 30; *see also id.* at 36 (arguing it is obvious that the “common record player” although in modified form that includes sensor SD, plays standard vinyl records containing audio recordings).

As Petitioner points out, Figure 4 expressly shows a phono cartridge, tonearm, and rotatable platter, which indicates the record player plays standard vinyl records. Ex. 1004, Fig. 4; Pet. 34–39. Moreover, Cortellesi expressly discloses placing the virtual disk “on the turn table of a common record player.” Ex. 1004, 4:40–41.

Having sufficiently established that Cortellesi teaches the use of a record player that may be used to play vinyl records, Petitioner argues it would have been obvious to connect the analog output of the “common record player” to Cortellesi’s CA/D. Pet. 27. Figure 1 of Cortellesi explicitly depicts left and right analog inputs into CA/D. Ex. 1004, Fig. 1.

Cortellesi also provides a reason to digitize analog audio output of record players. Pet. 27. As argued by Petitioner, “Cortellesi is attempting to address, among other things, a problem that plagued disk jockeys: having to transport a large collection of records to sites where the disk jockey is performing.” *Id.* (citing Ex. 1004, 1:3–11; Ex. 1002 ¶ 57). “To avoid this problem, Cortellesi’s system allows a disk jockey to digitize a collection of records, by converting the audio on the record to digital form and storing the recording on a hard disk.” *Id.* (citing Ex. 1004, 1:18–23; Ex. 1002 ¶ 58). In addition, Cortellesi explicitly teaches recording the output of record players using the apparatus:

The recording function provided by the apparatus makes it possible to record pieces of music both live through microphone or preamplified line connection and directly from standard playing units, such as compact disk players, tape recorders, and record players.

Ex. 1004, 1:30–34 (*cited in* Pet. 28); *see also id.* at 3:25–29, 5:7–11.

Cortellesi further teaches using CA/D to convert music from analogue sources such as vinyl records:

According to a preferred embodiment the apparatus of the invention includes: . . . a digital/analogue converter CA/D for storing directly from audio analogue sources (vinyl records, tapes, radio, live) and for receiving signals from a virtual disk, if any.

Id. at 2:22–37 (*cited in* Pet. 28); *see also supra* Sec. II.D.2.

In addition, as discussed above, *supra* Sec. II.D.3, Cortellesi teaches the claimed controller. In view of these teachings, Petitioner has established sufficiently that Cortellesi teaches not only playing vinyl records on a record

player, but also CA/D of the apparatus converting the audio analog signals to audio digital signals and a controller as claimed.

In making determining whether it would have been obvious for the CA/D and EC to be within the housing of the “common record player,”

our analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.

KSR Int’l. Co., 550 U.S. at 418 (quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)). In other words, we need not find precise disclosure of CA/D and EC being contained within the housing of the record player in Cortellesi, but rather we may take into account the inferences and creative steps that a person of ordinary skill in the art would employ.

Petitioner provides the following reasons to include CA/D and EC within the housing of the record player, such as the record player shown in Figure 4 of Cortellesi:

Cortellesi explains that the invention is a “[p]ortable apparatus for storing, handling and listening to pieces of music”. Because the analog-to-digital converter (CA/D) and the controller (EC) are both necessary for these functions, it would have been obvious to “include” them within the turntable Moreover such embodiment stands to reason as integrating these components would have increased the portability and ease of use, as opposed to connecting or installing the components once on-site at a disco hall, dance club or restaurant.

Pet. 31 (citing Ex. 1004, 2:23–3:37, 2:50–58, 3:25–36, 4:23–55; Ex. 1002 ¶ 65).

Petitioner also provides evidence that implementing the components at issue within a portable housing would have been well-known and

common because “[a]s Dr. Moon explains, in the relevant timeframe, analog-to-digital converters and controllers were small integrated circuits that had been integrated into the housings of numerous consumer products.” *Id.* at 31–32 (citing Ex. 1002 ¶ 66; Ex. 1014, 7:53–67; Ex. 1015, 5:19–25; Ex. 1016, Abstract; Ex. 1018, Figs. 5–7, rn. 3, 4, 41, 5:12–33; Ex. 1019, 4:26–39).

The disclosure of the ’498 patent supports the opinion that implementing analog-to-digital converters and controllers within the housing of a record player was well-known to ordinarily skilled artisans at the time of invention. The ’498 patent acknowledges that some turntables at the time of invention provided audio digital output signals. Namely, the ’498 patent states that the Sony/Phillips Digital Interface (SPDIF) “has been built into some turntables in order to provide a digital output.” Ex. 1001, 1:35–36. Therefore, by the ’498 patent’s own admission, implementing analog-to-digital conversion and a controller to provide audio digital output signals to a digital output interface within a turntable was already known in the art.

Indeed, according to the ’498 patent specification, the inventive feature was not implementing analog-to-digital conversion and a controller providing audio digital output signals to a digital output interface, but rather was the type of digital output interface. Namely, in acknowledging that other turntables provided digital audio output signals (and therefore would have included an analog-to-digital converter and controller), the ’498 patent states the SPDIF format “is not a standard protocol such as USB (universal serial bus) or firewire (IEEE 1394),” and that “[i]t is therefore an object of this invention to provide a turntable which includes digital output in a standard protocol, such as USB or firewire.” Ex. 1004, 1:43–45. To the

extent the '498 patent provides “eliminat[ing] the need for external audio conversion devices” as an object of the invention, it is apparent from the context that this refers to using a standard computer protocol that allows for connection to a computer, rather than to inclusion of an analog-to-digital converter and controller that outputs audio digital signals in a format that is not a standard computer protocol (such as SPDIF). *Id.* at 1:43–59.

We note that limitation [1g] requires that the output digital audio signal “uses a standard computer protocol,” but limitation [1f] does not specify a computer protocol. We address the output computer protocol in our discussion of limitation [1g], *infra* Sec. II.D.5. However, as to limitation [1f], we are persuaded this feature would have been well-known and obvious.

Furthermore, the disclosure of the '498 patent supports the opinion that implementing analog-to-digital converters and controllers within the housing of a record player would have required only routine knowledge and been easily implemented by an ordinarily skilled artisan. The '498 patent discloses that these components are within the turntable, without any description of how to accomplish this, and with no indication that any technical challenges existed or needed to be overcome. Ex. 1001, 2:21–23, 2:42–46.

Patent Owner argues it would not have been obvious to implement CA/D and EC within Cortellesi's record player on the basis that a DJ would not have wanted to haul a record player to music venues, but rather would have wanted a more portable apparatus that did not include the record player. PO Resp. 28–32. In support of this argument, Patent Owner relies on the testimony of Mr. Zatkovich, who makes several statements regarding

what a DJ would have wanted. *Id.* (citing Ex. 2004 ¶¶ 151, 157–165). However, aside from citing statements in Cortellesi, Mr. Zatkovich does not cite any evidence to support or corroborate his testimony. *See* Ex. 2004 ¶¶ 151, 157–165.

Mr. Zatkovich opines that the purpose of Cortellesi is to provide a portable device with digitally stored music to avoid the need to haul around records and that including a record player in Cortellesi’s apparatus would have negatively impacted its portability. Ex. 2004 ¶¶ 158 (citing Ex. 1004 ¶ 1), 159 (citing Ex. 1004 ¶ 2), 163. These are two separate points. As to the second point, as we discussed above, Cortellesi provides reasons for including a record player as part of the portable apparatus, namely in order to use the virtual disk feature Cortellesi at live music venues. As to the first point regarding hauling records to a performance venue, this argument at best indicates a DJ might not bring an entire vinyl record collection to a performance venue; however, it in no way undermines Cortellesi’s teaching of using the virtual disk feature which would have resulted in the portable apparatus including a record player in order to use the virtual disk feature. In addition, Cortellesi’s express disclosure contradicts Mr. Zatkovich’s testimony that the portable would not have included a record player so that DJs would not have to haul music around. Cortellesi expressly discloses an embodiment in which the apparatus includes a CD player and one in which it includes a virtual disk allowing the operator to act manually even in a digital context (i.e., it includes the turn table). *See, e.g.*, Ex. 1004, claims 14, 16.

The remainder of Mr. Zatkovich’s testimony consists of unsupported statements in which he speculates that venues such as weddings “may already have equipment,” venues such as nightclubs “will already” have

“nearly all of the technical equipment” at the venue, and ultimately that a DJ “may only play music and not put on a visual display” and therefore would not use a virtual disk. Ex. 2004 ¶¶ 160–162, 164. This is mere speculation, and moreover, is not supported or corroborated by evidence. Moreover, nothing in Mr. Zatkovich’s experience indicates personal knowledge or experience in the field of live DJ performances. Ex. 2004 ¶¶ 5–12. He has a degree in Computer Science with a minor in Electrical Engineering, over 30 years of experience in computer science, including telecommunications, eCommerce, cybersecurity, electronic publishing systems, user & device authentication, software licensing, media distribution, Digital Rights Management, software, copyright, and software copy protection, and has worked in industries including embedded internet systems, cellular telephony, and cloud-based services. *Id.* ¶¶ 5–7. Mr. Zatkovich’s work experience, however, does not indicate any experience in the field of live music performances and/or DJ performances, and he has not provided the basis for his opinions regarding such.

c) Conclusion on limitation [1f]

Having reviewed the record in this proceeding, we determine that Petitioner has demonstrated sufficiently that Cortellesi meets limitation [1f].

5. Limitation [1g]

Petitioner provides evidence and arguments that Cortellesi teaches:

[1g] wherein said output digital audio signal is output from said turntable and uses standard computer protocol.

Pet. 46–48.

We highlight the following; however, these highlights should not be interpreted as limiting our findings and conclusions.

There is no dispute amongst the parties that USB is within the scope of the phrase “standard computer protocol” as recited in limitation [1g]. The ’498 patent supports this understanding, disclosing “providing an audio conversion device to USB, firewire, or other standard computer digital communication protocol.” Ex. 1001, 1:52–57.

Cortellesi discloses that its apparatus includes various interfaces including “USB-interface that allows the apparatus to be directly connected to a personal computer for digital data processing/transmitting by software programs that improve the quality of the recorded pieces of music (removal of ground noise/interferences, digital mixing).” Ex. 1004, 3:44–4:14; *quoted in* Pet. 46. Cortellesi therefore discloses a turntable (i.e., apparatus, *see supra* Sec. II.D.4) outputting a digital signal (via USB-interface) using standard computer protocol (USB).

In dispute is whether Cortellesi teaches that its USB signal is an “output digital audio signal,” as recited in limitation [1g]. The “said output digital audio signal” recited in limitation [1g] refers to the following recitation of limitation [1e]: “an output digital audio signal of music or speech representative of an audio recording from an output of said analog to digital converter, representative of said analog audio signal,” and is generated the controller. Ex. 1004, 2:66–3:3.

Petitioner asserts that because Cortellesi’s USB-interface allows the apparatus to be directly connected to a personal computer for digital data processing of recorded pieces of music, it would have been obvious that the USB output is an “output digital audio signal.” Pet. 47–48. For example,

Cortellesi's disclosure that the USB interface allows for transmission of digital data to a computer to "improve quality of the recorded pieces of music" through, e.g., removing noise and digital mixing, suggests, according to Petitioner, that the digital data is audio data because noise is removed from the audio data or the audio data is digitally mixed to create new audio data. *Id.* at 48 (citing Ex. 1004, 4:8–13).

Patent Owner argues that Cortellesi "only discloses USB in the context of the apparatus of Figure 1." PO Resp. 32 (citing Ex. 2004 ¶ 168). Patent Owner argues further that "simply adding an analog to digital converter and controller to the conventional turntable of Figure 4 (or even combining the turntable of Figure 4 with the apparatus of Figure 2) does not satisfy the claim language of Claim 1" that is recited in limitation [1e], or of claim 2 (which specifies the standard computer protocol is USB). *Id.* at 32–33. Patent Owner concludes that Petitioner has not argued it would have been obvious to integrate USB into Figure 4, and therefore, has failed to meet its burden of proof. *Id.* (citing Pet. 46).

Notably, Patent Owner does not provide evidence or argument to dispute that Cortellesi teaches, at Ex. 1004, 4:8–13, that it's USB interface outputs digital audio signals of music or speech representative of an audio recording (e.g., from a vinyl record played on the record player) from an output of its analog to digital converter (e.g., CA/D), representative of said analog audio signal. Indeed, as we discussed above, Petitioner argues persuasively that Cortellesi teaches this feature because Cortellesi discloses the USB interface of the apparatus connecting directly to a personal computer for digital transmission to the personal computer to software

programs that improve the quality of the recorded pieces of music by, e.g., removing noise. Ex. 1004, 4:8–13; Pet. 46.

Patent Owner’s evidence and argument, therefore, is not directed to showing that Cortellesi’s USB interface fails to teach outputting the claimed signal, but rather that the USB interface of Cortellesi’s apparatus applies only to Figure 1. PO Resp. 32. For reasons discussed above regarding limitation [1f], *supra* Sec. II.D.4, we are not persuaded by Patent Owner’s argument, because Petitioner has shown that Figure 4 refers to the apparatus of Cortellesi’s invention and/or that such would have been obvious. To the extent that Patent Owner argues that Petitioner’s obviousness argument does not specifically explain why the USB-interface, in particular, would have been obvious to include in the Figure 4 embodiment of Cortellesi, Patent Owner is seeking out precise teachings directed to the specific subject matter of the challenged claim, rather than the inferences and creative steps that a person of ordinary skill in the art would employ, which the Supreme Court has cautioned against. *KSR Int’l. Co.*, 550 U.S. at 418. For reasons discussed above, *supra* Sec. II.D.4, Petitioner has provided sufficient reasons as to why an ordinarily skilled artisan would have housed the portable apparatus of Cortellesi’s invention (such as the components shown in Figures 1 and 2) into a record player, such as the one shown in Figure 4. *See also* Pet. Reply 16 (explaining Figure 4 is a “top plan view” that is not intended to show every interface and that Cortellesi generally describes the apparatus’s inclusion of a USB port in a manner that is not limited to a specific embodiment). Cortellesi does not need to state expressly that the USB-interface shown in Figure 1 is also present in the embodiment of Figure 4, in order for a skilled artisan to have arrived at such an

embodiment, and as argued by Petitioner, Cortellesi does not limit its teaching of a USB interface to a particular embodiment of the apparatus.
Reply 20.

Moreover, we disagree with Patent Owner's assertion that Petitioner "does not argue it would be obvious to also integrate USB (or Firewire or other standard) into Figure 4." PO Resp. 33 (citing Pet. 46). Petitioner argues it would have been obvious to include USB, specifically with regard to limitation [1g], at pages of 47 to 48 of the Petition. Tellingly, Patent Owner does not cite to these pages in contending Petitioner has not made an obviousness argument. To the extent Patent Owner's argument is that Petitioner fails to expressly mention Figure 4 in its obviousness analysis for limitation [1g], Patent Owner neither cites to nor addresses Petitioner's arguments at pages 47 to 48 of the Petition.

As Petitioner argues persuasively, in view of Cortellesi's teachings of providing a variety of potential analog or digital audio input signals representing an audio recording (*see, e.g.*, Ex. 1004, 3:44–4:14), converting analog audio input to a digital audio signal (*see, e.g.*, Ex. 1004, 2:33–4:36, Ex. 1004, 6:3–6), receipt of digital signals from CA/D by EC (*see, e.g.*, Ex. 1004, 4:50–52, Figs. 1, 2), and output by EC of the digital audio signal either to storage (*see, e.g.*, Ex. 1004, 2:37–41, Fig. 2 (showing EC connected directly to storage UM)) or over USB (*see, e.g.*, Ex. 1004, 4:8–13), it would have been obvious that the EC in Cortellesi outputs a digital audio signal to an external computer via a USB-interface. Pet. 47–48. Petitioner provides sufficient reasons, as we discussed above, regarding limitations [1a] to [1f] for the apparatus to generate the claimed output digital audio signal and for the apparatus to be within a turntable, and has shown sufficient reasons for

EC to provide the claimed output over a USB interface, namely the reason provided in Cortellesi—i.e., so that a personal computer can improve the sound quality of musical recordings.

Having reviewed the record in this proceeding, we determine that Petitioner has demonstrated sufficiently that Cortellesi meets limitation [1g].

6. *Rationale Supporting Obviousness*

Although this ground is based on a single reference, Cortellesi, Petitioner presents this ground as one of obviousness “because, while a POSITA would understand that Cortellesi has all components of the ’498 patent claims, Cortellesi does not always expressly describe or name those components.” Pet. 25. Petitioner asserts that there are “three principal instances where obviousness is employed.” *Id.*

We highlight the following; however, these highlights should not be interpreted as limiting our findings and conclusions.

Petitioner asserts that Cortellesi is analogous art to the ’498 patent, and that a skilled artisan would have had a reasonable expectation of success in arriving at the claimed invention. *Id.* at 33–34.

“In order for a reference to be proper for use in an obviousness rejection under 35 U.S.C. [§] 103, the reference must be analogous art to the claimed invention.” MPEP § 2141.01(a) (citing *In re Bigio*, 381 F.3d 1320, 1325 (Fed. Cir. 2004)).

Our reviewing court has set forth a two-prong test for determining whether a prior art reference is analogous: (1) whether the reference is from the same field of endeavor as the claimed invention, and (2) if the reference is not within the same field of endeavor, whether the reference is reasonably

pertinent to the particular problem with which the inventor is involved. *In re Klein*, 647 F.3d 1343 (Fed. Cir. 2011).

In order for a reference to be “reasonably pertinent” to the problem, it must “logically . . . have commended itself to an inventor’s attention in considering his problem.” *In re ICON Health and Fitness, Inc.*, 496 F.3d 1374, 1379–80 (Fed. Cir. 2007) (quoting *In re Clay*, 966 F.2d 656, 658 (Fed. Cir. 1992)).

Petitioner asserts Cortellesi meets both prongs. Pet. 33–34. As to field of endeavor, Petitioner asserts the ’498 patent is in the field of audio signals technology. *Id.* at 33 (citing Ex. 1001, Abstract; Ex. 1004, Abstract; Ex. 1002 ¶ 74). We are persuaded that Cortellesi is in the same field of endeavor as the ’498 patent. The “Field of Invention” of the ’498 patent “relates to a phonographic turntable which includes a built-in audio conversion device, which is typically to USB firewire, or other computer digital communication protocol.” Ex. 1001, 1:7–11. Cortellesi “relates to the professional playing of records and particularly directed to discos, dance-halls and restaurants, where there is a problem of having a lot of records available, as well as professionals so-called disk jockeys working in discos and private broadcasting companies with the need of being always ready to transmit pieces of music by request or jingles without solution of continuity.” Ex. 1005, 1:3–11; *see also id.* at, *e.g.*, 2:25–3:5, 4:8–13 (describing sending audio signals from a record player to central processing unit EC and sending recorded pieces of music to a personal computer to improve the quality of the music).

These disclosures touch upon both the field of invention and the particular problem attempting to be solved. As evidenced from the above

excerpts, both references relate to outputting audio signals from a turntable to a computer for processing. Therefore, we find Cortellesi and the '498 patent are from the same field of endeavor, and as a result are analogous art.

Having found Cortellesi is analogous art as being in the same field of endeavor as the '498 patent, we need not reach the question of whether Cortellesi is reasonably pertinent to the particular problem with which the '498 patent is involved. That said, for reasons discussed below we find Cortellesi also satisfies prong two of the analogous art inquiry.

The only problem with the prior art expressed in the '498 patent is that, to the extent prior art record players provide digital (rather than analog) audio output, the digital output (e.g., SPDIF) is not “a standard [computer] protocol such as USB . . . or firewire.” Ex. 1001, 1:35–38. The '498 patent does not express any technical challenges that needed to be overcome in order to implement a standard computer protocol, and as such, there is no technical problem with which the inventor of the '498 patent was involved. It appears the invention, therefore, amounts to recognition that a standard computer protocol output would have been desirable in order to connect the record player to a computer. To the extent such recognition could be considered “a particular problem with which the inventor is involved,” for reasons discussed above regarding implementation of USB within Cortellesi, *supra* Sec. II.D.5, Cortellesi also is concerned with providing audio signals from sources such as a record player to a computer. *See also, e.g.*, Ex. 1004, 4:8–13.

Although Patent Owner asserts that Petitioner misunderstands the prior art and Cortellesi is an “irrelevant reference[],” Patent Owner does not expressly contend that Cortellesi is non-analogous art, and does not

expressly address the factors set forth in *In re Klein*. PO Resp. 3–8 (arguing Petitioner misunderstands prior art), 15–20 (providing background regarding Cortellesi), 20–36 (arguing non-obviousness, but not arguing that Cortellesi is non-analogous). In addition, Patent Owner’s arguments that Cortellesi is irrelevant because it relates to turntablism and disk jockeys (*see, e.g.*, PO Resp. 3–8) are based on testimony by Mr. Zatkovich, which for reasons discussed above, *supra* Sec. II.D.4, is unsupported. Accordingly, Patent Owner’s arguments and evidence do not undermine Petitioner’s showing that Cortellesi is analogous art to the ’498 patent.

We next address Petitioner’s assertion that there are “three principal instances where obviousness is employed.” Pet. 25.

Petitioner’s first “principal instance” is that Cortellesi does not expressly use the terms “rotatable platter,” “tonearm,” and “phono cartridge.” However, as argued by Petitioner, a skilled artisan would have understood that a common record player, as disclosed in Cortellesi, would have had these features. *Id.* at 25–26. Cortellesi’s description of a common record player for playing common LPs (*e.g.*, Ex. 1004, 4:40–42), as well as Figure 4 (discussed by Dr. Moon, *e.g.*, at Ex. 1002 ¶¶ 52–54) showing a rotatable platter, tone arm, and phono cartridge, supports Petitioner’s position.

As to the second “principal instance,” Petitioner acknowledges that although Cortellesi provides explicit details of playing a virtual disk using Cortellesi’s turntable and digitizing the analog signal created by playing such disk, Cortellesi does not provide an explicit embodiment describing the details of playing an LP and digitizing the analog audio signal created by playing the LP. Pet. 26–31. According to Petitioner, however, it would

have been understood or obvious that this feature was included in Cortellesi's turntable. *Id.* Specifically, Cortellesi teaches a portable apparatus that includes a turntable that plays common records, wherein the apparatus can store a digitized collection of LP's, thereby avoiding the need to transport numerous LP's to music venues. Ex. 1004, 2:18–23, 2:30–36, 4:40–42. The digitization process, Petitioner argues, would have been one of the features of Cortellesi's turntable, as Cortellesi explicitly teaches a turntable that plays common records, and the turntable having CA/D for converting audio signals from vinyl records to digital and storing such recorded music. Pet. 26–31. For reasons discussed above, *supra* Sec. II.D.1–II.D.4, Petitioner has shown sufficiently that Cortellesi teaches and/or suggests, or it would have been obvious, to use the turntable in Cortellesi to play conventional records and to use CA/D to convert the audio signal from the conventional record to a digital audio signal.

Petitioner's third "principal instance" appears to be a contingent argument, i.e., it is contingent upon our finding that Cortellesi's turntable is a subpart of the apparatus, and does not include CA/D and EC. Pet. 31–32. However, for reasons discussed above, *supra* Sec. II.D.4, Petitioner has shown sufficiently that Cortellesi teaches and/or suggests, or it would have been obvious, that the apparatus shown in Figure 4 of Cortellesi includes CA/D and EC.

We address the above principal instances in our discussion of limitations [1a]–[1g] above, *supra* Secs. II.D.1–II.D.5, including Petitioner's arguments and evidence, as well as Patent Owner's responsive arguments and evidence.

Having reviewed and considered the evidence and arguments presented by the parties, we determine Petitioner has articulated sufficient rationale that a person of ordinary skill in the art would have found claim 1 obvious in view of Cortellesi. Accordingly, Petitioner has demonstrated by a preponderance of the evidence that claim 1 would have been obvious in view of Cortellesi.

7. *Dependent Claims 2 and 4–6*

Petitioner argues that Cortellesi teaches the recited limitations of dependent claims 2 and 4–6. *See* Pet. 48–50. Petitioner provides the testimony of Dr. Moon in support of its position. *See* Ex. 1002 ¶¶ 101–104.

Claim 2 depends from claim 1, and further specifies the standard computer protocol is USB. Ex. 1001, 3:8–9. As discussed above regarding limitation [1g] of claim 1, *supra* Sec. II.D.5, Cortellesi discloses USB, and Petitioner relies on USB as the standard computer protocol in arguing claim 1. For the same reasons as we discussed for claim 1, Petitioner has made a sufficient showing for claim 2.

Claims 4, 5, and 6 add a jack for outputting the output digital audio signal, configuring the turntable's rotatable platter to receive a record with an audio recording, and configuring the tonearm to engage a phonocartidge against a record with an audio recording thereon, respectively. Ex. 1001, 4:1–9. As shown by Petitioner, these claims recite elements disclosed, taught, or suggested in Cortellesi, or that would have been obvious in view of these references. Pet. 48–50 (citing Ex. 1004, 1:3–17, 4:8–13, 3:44–4:20; Ex. 1002 ¶¶ 101–104; Ex. 1010, 1:23–36; Ex. 1011, 13:61–63; Ex. 1005 ¶ 26; Ex. 1007, 1). The evidence cited by Petitioner shows that the additional limitations recited in claims 4–6 relate to standard features

associated with a USB interface (i.e., the jack recited in claim 4) or standard features of a record player (i.e., configurations recited in claims 5 and 6 related to playing a record) that were well known to ordinarily skilled artisans, and the combinations proposed by Petitioner amount to both the arrangement of old elements each performing the same function it had been known to perform and mere substitution of one element for another known in the field, and this arrangement/substitution yields no more than a predictable result. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007).

Patent Owner does not introduce additional evidence or arguments directed to dependent claims 2 and 4–6, apart from those issues discussed above with respect to independent claim 1.⁶ See PO Resp. 36–37.

Having reviewed the record in this proceeding, we are persuaded that Petitioner has demonstrated by a preponderance of the evidence that claims 2 and 4–6 would have been obvious in view of Cortellesi.

E. Obviousness over the Combination of Cortellesi and Georges

Petitioner asserts unpatentability under 35 U.S.C. § 103 of claim 3 as obvious over the combination of Cortellesi and Georges. Pet. 50–52. Claim 3 recites “[t]he turntable of claim 1 wherein said output digital audio signal uses firewire (IEEE-1394) protocol.” Ex. 1001, 3:10–11.

⁶ With regard to claim 2 of the ’498 patent, Patent Owner asserts that “Cortellesi does not disclose or suggest the limitation ‘wherein said output digital audio signal uses universal serial bus (USB) protocol.’” PO Resp. 37 (citing Ex. 2004 ¶¶ 192–195). However, Patent Owner’s only argument in support of this assertion is reference to argument for claim 1, which we address in our discussion of claim 1. *Id.* (“Cortellesi’s ‘USB’ interface does not meet claim 1’s requirement that ‘said output digital audio signal is output from said turntable’”) (citing Ex. 2004 ¶ 194).

Having determined that Petitioner has established by a preponderance of the evidence that claim 1 would have been obvious in view of Cortellesi, *supra* Sec. II.D.1–II.D.6, the issue claim 3 raises is whether it would have been obvious to use the firewire protocol instead of the USB protocol in the system argued for claim 1.

Petitioner relies on Georges for the teaching of an output digital audio signal using firewire. Pet. 50–52. For example, Georges, teaches “[s]ystems and methods for creating, modifying, interacting with and playing music.” Ex. 1013, Abstract (*cited in* Pet. 51). Georges further teaches a digital signal processing module that is connected by a “high speed bus (e.g., IEEE 1394, or USB, etc.).” *Id.* ¶ 311 (*cited in* Pet. 51). Petitioner provides argument and evidence that Georges is analogous art to the ’498 patent and articulates a rationale for combining Georges with Cortellesi to arrive at claim 3.

Pet. 50–52. We are persuaded by Petitioner’s evidence and arguments that it would have been obvious to use firewire instead of USB in the system argued for claim 1, as this amounts to both the arrangement of old elements each performing the same function it had been known to perform and mere substitution of one element for another known in the field, and this arrangement/substitution yields no more than a predictable result. *KSR Int’l Co.*, 550 U.S. at 416.

Patent Owner does not introduce additional evidence or arguments directed to dependent claim 3, apart from those issues discussed above with respect to independent claim 1. *See* PO Resp. 36–37.

Having reviewed to record in this proceeding, we are persuaded that Petitioner has demonstrated by a preponderance of the evidence that claim 3

would have been obvious in view of the combination of Cortellesi and Georges.

F. Obviousness over the Combination of Spencer and Cohen

Petitioner asserts unpatentability under 35 U.S.C. § 103 of claims 1, 2, and 4–6 as obvious over the combination of Spencer and Cohen. Pet. 52–72.

We first address claim 1—the only independent claim. Patent Owner does not identify clearly the claim limitation to which each of its arguments apply (PO Resp. 40–51), except for some arguments clearly directed at limitation [1e] (PO Resp. 51–52). Rather, Patent Owner identifies language from multiple claim limitations in asserting that the combined art does not “Disclose or Render Obvious the Limitations of the Challenged Claims.”

PO Resp. 40. Based on the language taken from multiple claim limitations, Patent Owner argues:

as properly construed, claim 1 requires that the output digital audio signal be reproducibly indistinguishable to a listener, but in a different format from, the original analog audio signal from the record, and this must be output from the turntable.

Id. For reasons discussed above with regard to claim construction, *supra* Sec. II.B.3, the claims do not require an output digital audio signal that is reproducibly indistinguishable to a listener, but in a different format from, the original audio signal.

Below, we address each of Patent Owner’s remaining arguments within a subsection specific to a particular claim limitation. However, had we addressed the arguments within a different subsection, it would not have altered our analysis or this Decision.

We have considered Petitioner’s evidence and arguments, including the relevant testimony of Dr. Moon, as well as the evidence and arguments presented by Patent Owner, including the relevant testimony of Mr. Zatkovich. Based on our review of the record, we determine Petitioner has demonstrated by a preponderance of the evidence that claim 1 is unpatentable under 35 U.S.C. § 103 as obvious over the combination of Spencer and Cohen.

1. Preamble [1a] and limitations [1b] and [1c]

Petitioner provides evidence and arguments that Spencer teaches:

[1a] A turntable including:

[1b] a rotatable platter;

[1c] a tonearm for receiving a phono cartridge for generating an analog audio signal representative of an audio analog recording.

Pet. 62–65.

Patent Owner does not contest Petitioner’s evidence and arguments with respect to these limitations. *See* PO Resp. 40–52.

We highlight the following; however, these highlights should not be interpreted as limiting our findings and conclusions.

Petitioner argues, and Patent Owner does not dispute, that limitations [1b] and [1c] recite features of turntables that were conventional and well-known in the relevant time frame. Pet. 9–12; Ex. 1002 ¶¶ 28–29. We agree these features were conventional and well known in the relevant time frame. *See, e.g.*, Ex. 1001, 1:52–53 (acknowledging a “revolving platter, a pivoting tonearm and an analog phonocartidge” were “conventional features” of a turntable). We also agree with Petitioner that a skilled artisan would have understood Spencer’s turntable as having these features. Pet. 62–65.

Spencer discloses a turntable, illustrated in Figure 2 reproduced below. Ex. 1005 ¶ 33, Fig. 2 (*cited in Pet. 62*).

FIG. 2

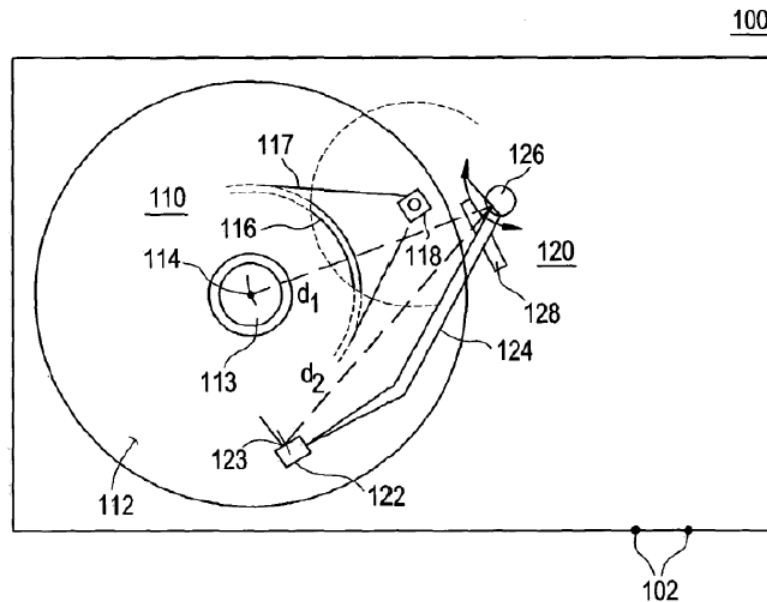


Figure 2 of Spencer illustrates a turntable unit. Ex. 1005 ¶¶ 19, 20.

Figure 2 of Spencer illustrates “controller unit 100, e.g., a turntable unit.”⁷ Ex. 1005 ¶¶ 19, 30, Fig. 2. Spencer discloses that the turntable includes a rotatable platter—i.e., turntable platter 112 having a rotatable supporting surface. *Id.* ¶ 34 (*cited in Pet. 63*). Spencer also discloses that the turntable includes a tone arm for receiving a phono cartridge, as recited in this limitation. For example, Spencer discloses tone arm assembly 120 including tone arm 124 and cartridge 122. *Id.* ¶ 36 (*cited in Pet. 63–64*). Petitioner argues that it would have been understood that Spencer’s tone arm for

⁷ Herein, we refer to controller unit 100 alternately as “turntable 100” or “turntable.”

receiving a phono cartridge is “for generating an analog audio signal representative of an audio analog recording” because Spencer teaches that the turntable including these assemblies is for playing vinyl records.

Pet. 64–65 (citing Ex. 1005 ¶ 8).

Having reviewed the record in this proceeding, we determine that Petitioner has demonstrated sufficiently that Spencer teaches the preamble of [1a] and limitations [1b] and [1c].

2. *Limitation [1d]*

Petitioner provides evidence and arguments that the combination of Spencer and Cohen teaches:

[1d] an analog to digital converter for receiving an analog audio signal from the phone cartridge.

Pet. 65–67.

We highlight the following; however, these highlights should not be interpreted as limiting our findings and conclusions.

It appears the dispute between the parties is not whether the overall system in Spencer performs analog to digital conversion of an audio signal at some point in the process of synchronizing audio waveforms from an analog source such as turntable 100 with audio wave forms from a digital source (such as a CD player). Rather, the dispute regards whether the analog to digital conversion occurs within Spencer’s turntable 100 (limitation [1f]), and consequently, whether output digital audio signals of music or speech representative of an audio recording (limitation [1e]) are communicated from turntable 100 to data processor unit 200 over USB ports 102/202 (limitation [1g]).

Although limitation [1d] recites only the analog to digital converter, and limitations [1e], [1f], and [1g] recite the latter requirements, Petitioner's reasoning as to why Spencer teaches or suggests an analog to digital converter also touches upon whether Spencer teaches or suggests limitations [1e], [1f], and [1g]. Pet. 57–61, 65–70. Furthermore, Patent Owner's arguments regarding analog to digital conversion within Spencer's system implicate limitations [1d], [1e], [1f], and [1g]. PO Resp. 40–52.

Specifically, the parties appear to agree that Spencer does not expressly disclose an analog to digital converter as recited in limitation [1d], and Petitioner argues Spencer teaches or suggests an analog to digital converter (*see* Pet. 65–66) within turntable 100 (*see id.* at 69–70), whereas Patent Owner argues Spencer teaches or suggests an analog to digital converter within data processor unit 200 (*see* PO Resp. 40–52). Although we address the issue of analog to digital conversion within Spencer in this subsection, our analysis also applies to other limitations of claim 1.

Petitioner acknowledges that Spencer does not expressly disclose limitation [1d]. Pet. 65–67. However, because Spencer expressly discloses turntable 100 transmitting *digitized audio signals* to data processor unit 200, a skilled artisan would have understood turntable 100 includes an analog to digital converter in order to generate the digitized audio signals. *Id.* In particular, Spencer discloses a turntable

coupled to corresponding SCSI, USB, or other suitable type port 202 on the data processor unit to communicate *digitized audio signals* and information useful in determining an intratrack needle position from the controlling unit 100 to the data processor unit 200.

Ex. 1005 ¶ 30 (emphasis added) (*cited in* Pet. 65–66). Petitioner argues that “digitized” audio signals are signals that have been converted from analog to digital. Pet. 66; *see* Prelim. Resp. 23–30. Petitioner argues further that transmission of audio signals over Spencer’s USB interface—i.e., a digital communications interface—would have suggested to an ordinarily skilled artisan that such signals would have been digital signals, not analog audio signals (which typically would not have been transmitted using USB). Pet. Reply 25 (citing Ex. 1029, 30:1–24). Because Spencer’s turntable includes a USB port coupled to data processor 200, and communicates “digitized audio signals and [needle tracking information]” to the data processor via a USB port, Petitioner argues Spencer suggests that the analog audio signal from the turntable’s phono cartridge has been digitized within the turntable—i.e., the turntable has an analog to digital converter that converts analog audio signals from the phono cartridge into a digitized audio signal. Pet. 65–66.

Petitioner further argues that Cohen expressly discloses an analog to digital converter within a turntable, and even though the signals in Cohen are MIDI signals rather than audio signals, Cohen shows that it was well known to implement analog to digital converter solutions within a turntable. Pet. 57–67, 66–67; Ex. 1006 ¶¶ 15–16, Fig. 1.

Petitioner argues that it would have been obvious in view of the combined teachings of Spencer and Cohen to use an analog to digital converter for receiving an analog audio signal from the phono cartridge. Pet. 65–67.

Spencer’s disclosure supports Petitioner’s position. Specifically, Spencer’s disclosure of the turntable communicating “digitized audio signals and information useful in determining an intratrack needle position” refers to

communication of two things: (1) digitized audio signals, *and* (2) information useful in determining needle position. Ex. 1005 ¶ 30. For reasons discussed below, the term “digitized audio signals” suggests an analog to digital converter has digitized analog audio signals representative of an audio recording on a vinyl record played on turntable 100.

Patent Owner acknowledges that turntable 100 generates analog audio signals representative of an audio recording stored on a vinyl record. PO Resp. 40–42, 45. However, despite Spencer’s express disclosure that turntable 100 outputs digitized audio signals (Ex. 1005 ¶ 30), Patent Owner argues that Spencer teaches outputting the audio signal from a vinyl record as an analog audio signal, rather than as a digitized audio signal (PO Resp. 42–49).

In support of its argument, Patent Owner asserts that Petitioner “misreads ¶ 30 of Spencer and ignores the full context of Spencer.” PO Resp. 43. According to Patent Owner, the “digitized audio signals” to which Spencer refers are signals used to determine the position of the turntable’s needle. *Id.* at 44 (citing Ex. 2004 ¶¶ 94, 87–90). Patent asserts, “[t]his, of course, makes sense when considering that the entire point of Spencer is to ‘detect[] a location on a surface [of a LP record] selected by a user and manipulating a digital source based on information relative to the detected location.’” *Id.* (citing Ex. 1005 ¶ 2) (second and third alteration in original); *see also* PO Resp. 44–45 (arguing that the “digitized audio signals” are “not representative of the analog audio signal of the record because they are not reproducibly indistinguishable to a listener from the original analog audio”).

Patent Owner’s assertion that the disclosed “digitized audio signal” in Spencer is not a digitized audio signal, but instead is needle position

information, strains credulity. As we discussed above, Spencer expressly discloses communicating *two* types of signals/information over its USB port: 1) digitized audio signals, *and* 2) information useful in determining an intratrack needle position. Ex. 1005 ¶ 30. Therefore, by its express language, namely use of the word “and” between the phrases “digitized audio signals” and “information useful in determining an intratrack needle position,” Spencer unambiguously differentiates “digitized audio signals” and information about needle position. Moreover, the phrase “digitized *audio* signals” itself refers to the signals as both digital and audio. Patent Owner does not provide any plausible explanation as to what the terms “digitized” and “audio” could possibly refer to other than an audio output signal such as that claimed. Information about needle position is not a plausible explanation.

In particular, not only does Spencer disclose two different types of signals/information communicated from turntable 100 to data processor unit 200—i.e., digitized audio signals and information about needle position—Spencer unambiguously discloses turntable 100 generating these two different types of signals/information. With regard to audio signals from a vinyl record, the signals are generated from a phono cartridge with a transducer for converting mechanical vibrations sensed by a stylus into analog electrical signals. Ex. 1005 ¶ 36. With regard to signals containing information useful in determining needle position, tone arm assembly signals are generated based on the detected position of the tone arm relative to the tone arm encoder, wherein tone arm assembly signals indicating the detected relative positions indicate the position of the stylus (i.e., needle position). *Id.* ¶¶ 37, 39. We find, therefore, that information useful in

determining an intratrack needle position (*id.* ¶ 30) refers, e.g., to tone arm assembly signals, and that digitized audio signals (*id.* ¶ 30) refers, e.g., to audio signals generated from the phono cartridge when playing a vinyl record, wherein the audio signals have been digitized.

Patent Owner also argues that Spencer does not send audio signals, much less digital audio signals, to data processor unit 200 because Spencer is not “directed to” playing music from a turntable through a computer. PO Rep. 45. Regardless of what Spencer is “directed to,” Spencer discloses turntable 100 sending audio signals to data processor unit 200, as discussed below.

In particular, Spencer relates to synchronizing information specific to a location on a vinyl record with information on an external digital source (such as a CD). Ex. 1005 ¶¶ 7, 9, 13, 14. In accordance with this goal, Spencer teaches that in addition to providing information regarding needle position, in order for such information to be of any use in synchronizing an analog audio source with its counterpart from a digital audio source, Spencer also provides the audio signal corresponding to the needle position information. *See, e.g., id.* ¶¶ 14 (disclosing an aspect of the invention as including generating an analog audio waveform from a record player, generating corresponding position data related to portions of the analog audio waveform, providing a digital signal from, e.g., a CD, and outputting a digital signal based on the position data), 30 (disclosing outputting audio signals that are synchronized with an audio signal corresponding to a location on a record), 66 (teaching correlating portions of sampled analog signals (i.e., audio waveforms from the record) with tone arm assembly signals indicating needle position), 74 (teaching synchronizing points

sampled from the audio waveform with a digital output signal from an external digital source).

In other words, Spencer teaches turntable 100 providing audio signals representative of an audio recording stored on a vinyl record, and providing the audio signals to data processing unit 200 over USB. Indeed, despite its argument that Spencer is not directed to playing analog vinyl records through a computer, Patent Owner implicitly acknowledges that Spencer's turntable 100 nonetheless communicates audio signals representative of music recorded on a vinyl record to data processor unit 200. PO Sur-Reply 15. However, Patent Owner argues that such signals would have been understood as having been communicated to data processor unit 200 as analog signals. *Id.* at 15–23. In so arguing, rather than focusing on whether the claimed invention would have occurred to the ordinarily skilled artisan in view of Spencer, Patent Owner creates a hypothetical scenario—not disclosed in Spencer—showing how a skilled artisan could have avoided the claimed invention. Namely, Patent Owner speculates as to how a skilled artisan could have arrived at Spencer communicating audio signals from turntable 100 to data communications unit 200 in analog, rather than digital, format. *Id.* However, this is not the standard for determining obviousness. A proper understanding of the prior art extends to all that the art reasonably suggests, and is not limited to its articulated teachings, much less to potentially possible implementations. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007).

Specifically, Patent Owner identifies alternative ways, not disclosed or taught in Spencer, that audio signals could have been communicated in analog format from turntable 100 to data communication unit 200. PO Sur-

Reply 15–19. Patent Owner notes that Spencer includes unlabeled ports 106 and 209 in Figure 1 “either of which potentially could be used to transmit an audio signal.” *Id.* at 16 (citing Ex. 1029, 62:5–15). Patent Owner also argues “Spencer discloses an ‘analog audio output port 104’” that connects to an “external output device 430 such as a speaker.” *Id.* at 17 (citing Ex. 1005, Fig. 1). Patent Owner speculates that in a pre-production step, the analog audio signals could be transmitted from turntable 100 to data processor unit 200 using port 104. *Id.* at 17–18 (citing Ex. 1005 ¶ 65). Patent Owner also argues that a digital computer, such as data processor unit 200, could have accepted analog input signals through, e.g., a phono jack, and that Spencer even discloses video output ports on data processor unit 200. *Id.* at 18–19 (citing Ex. 1007; Ex. 1005 ¶ 30).

Even if we were to assume, arguendo, that it would have been possible, or that a skilled artisan could have conceived of a way, to transmit analog audio signals from turntable 100 to data processor unit 200 in Spencer’s system as Patent Owner argues, this would not undermine Petitioner’s showing, nor would it negate our findings and conclusions. The ability to come up with undisclosed implementations that would have enabled transmission of analog audio signals does not negate the suggestion that may be gleaned from the prior art as a whole to transmit digitized audio signals. *See Dystar Textilfarben GmbH v. Patrick Co.*, 464 F.3d 1356, 1368 (Fed. Cir. 2006) (explaining that implicit motivation exists when a suggestion may be gleaned from the prior art as a whole).

Patent Owner also argues that, aside from Spencer’s paragraph 30, every disclosure in Spencer of transmitting an audio signal from a vinyl record from turntable 100 to data processor unit 200 refers to the audio

signal as “analog.” PO Sur-Reply 19–23 (citing Ex. 1005 ¶¶ 29, 36, 65, 66, 67, 70, 73, 96, claims 1, 3, 23, 29, 34; Pet. Reply 26–28). Patent Owner further argues that Spencer discloses that data processor unit 200 (rather than turntable 100) digitizes the audio signal, based on disclosure of data processor unit 200 “sampling” the analog audio signal, wherein Patent Owner contends “sampling” refers to digitizing the audio signal. *See, e.g.*, Ex. 2004 ¶ 220 (Mr. Zatkovich reciting Spencer’s disclosure of data processor unit 200 sampling the audio waveform generated by stylus 123’s interaction with groove sidewalls of a LP record, and testifying that digitization therefore occurs within data processor unit 200).

Petitioner responds, however, that Spencer’s use of the word “analog” in this context does not refer to the format of the transmitted signal, but rather to the signal’s origin as an analog source, in order to distinguish it from the audio signal from an external digital source (e.g., CD player). Pet. Reply 24–28. Petitioner further responds that sampling does not refer to the process of digitizing an audio signal, but rather refers to a process necessary for synchronization of the audio waveform sourced from the LP record with a signal sourced from a digital source such as a CD. *Id.* at 25–26. According to Petitioner, “it is clear that the entire process of receiving audio data from the playing of a record on controller 100, the process of waveform sampling, the process of creating a waveform map, and the process of synchronization are all occurring using digital data.” *Id.* at 25.

The evidence supports Petitioner’s, rather than Patent Owner’s, position.

First, the term “sampling,” with reference to signals, is not synonymous with the phrase “analog to digital conversion.” As explained

by Dr. Moon, and not contested by Mr. Zatkovich, analog to digital conversion involves “sampling” a waveform at regular time intervals ***and then converting the sampled values into a numerical representation.***

Ex. 1002 ¶ 32. Conversion of sampled values is an essential component of digitization—the sampled values exist along a continuous (analog) spectrum of possible values, until converted to one of a set of discrete values, and only upon this conversion is the signal represented in digital format. *See id.* ¶ 33 (explaining that a sample value of 0.93 may be converted to a value of 1.0). Furthermore, as discussed below, digital signals may be sampled (e.g., not all of the original digital values are retained—only digital values occurring at certain intervals, e.g., every other value, is retained), and therefore, sampling clearly does not refer to analog to digital conversion.

There is no description in Spencer of “sampling” as a process of digitizing a signal. Rather, Spencer describes sampling as a process to retain certain samples at specific time intervals in order to account for the progressive compression of information on LPs and increasing linear speeds as the stylus progresses to inner grooves within the LP.

Turntable 100’s rotatable platter rotates at a constant rate (i.e., proscribed revolutions per unit (RPM)) when playing a vinyl record. Ex. 1005 ¶ 69. Because linear speed is proportional to rotational speed (e.g., based on constant RPM) times radius (i.e., distance from center of LP), when stylus 123 is at the outermost ring of the record, it moves around the circumference at a higher linear speed than when stylus 123 is at the innermost ring of the record. *Id.* ¶ 67 (“as the stylus progresses . . . toward the center of the record . . . [information] move past the stylus at a decreasing speed”; disclosing linear speed is proportional to radius time

rotational speed). As a result, information (i.e., ripples in the grooves in the record wall that determine audio signals) is spaced further apart on the outermost ring and progressively closer together (compressed) toward the innermost ring. *Id.* ¶ 64 (disclosing that as the stylus moves toward the center of the LP, “ripples in the sidewalls become compressed to compensate for a record surface speed differential that occurs” as the stylus progresses from the outer portion of the LP to the inner portion).

In other words, data occurs less frequently when taken from the outermost most ring of the record, and occurs with increasing frequency as the stylus progresses to the innermost ring of the record. *Id.* ¶¶ 64, 67. As a result, the initial audio signal from a vinyl record will have information occurring at different rates, and must therefore be sampled in order to generate an audio waveform that has information at a constant rate. *Id.* ¶¶ 67–68. Spencer specifically discloses:

Data processor unit 200 may sample the audio waveform generated by the interaction of the stylus 123 and groove sidewalls at a progressively increased rate such that the analog audio waveform is sampled at an overall constant rate.

According to the principles of the present invention, the rate at which sampling of the audio waveform is progressively increased may be determined using information relative to the needle location and the base sampling rate. More specifically, the rate at which the audio waveform is sampled is inversely proportional to the instant radial distance, r , of the stylus 123 from the spindle 114. Accordingly, the sampling rate of the audio waveform at any radial distance must be based off a base sampling rate. Assuming the surface of the record is moving past the stylus 123 at the base turntable speed, the base sampling rate is the rate at which the data processor unit 200 generates the analog waveform.

Id. ¶¶ 67–68. In an embodiment, the base sampling rate is determined by the RPMs the analog record should be rotated by, or by the actual measured speed at which the record is rotated. *Id.* ¶ 69.

In sum, Spencer does not describe sampling as a means to digitize a signal, but rather describes sampling as a process to account for the progressive compression of information on vinyl records and increasing linear speeds as the stylus progresses to inner grooves within the vinyl record. Ultimately, this process of sampling allows for comparison of the audio signal originating from an analog source (e.g., vinyl record) with its corresponding audio signal originating from a digital source (e.g., CD), as argued by Petitioner. Pet. Reply 24–25 (citing Ex. 1005 ¶¶ 29, 65, 66, 67, 75). In pertinent part, Spencer discloses generating a waveform map that correlates portions of a sampled audio waveform (sampled from an analog source such as a vinyl record) with tone arm assembly signals useful in determining position of stylus 123 (Ex. 1005 ¶ 66); and generating a synchronization map by identifying synchronization points within the sampled audio waveform that allows for synchronization of a digital output audio signal from an external source (e.g., CD) and marking the synchronization points on the waveform map (*id.* ¶¶ 74–75).

Spencer consistently refers to the sampled audio waveform as an “analog waveform” and “analog audio waveform” even after sampling by data processor unit 200 (*see, e.g.*, Ex. 1005 ¶¶ 73, 74, 75)—and does so despite Patent Owner’s position that sampling refers to digitization. For example, after sampling the audio waveform sourced from a vinyl record in order to generate a waveform map, data processor unit 200 generates synchronization information for the sampled analog audio waveform.

Ex. 1005 ¶¶ 73–75. Moreover, a waveform shaper program used to compare waveforms from digital sources and turntable 100 (*id.* ¶ 58) “samples” portions of “the analog waveform in the waveform map” in order to synchronize output from a digital source with output from turntable 100. *Id.* ¶ 74. In this instance, because the analog waveform in the waveform map is itself sampled, Spencer describes sampling of a signal that has already been sampled. Therefore, sampling does not refer to digitizing a signal, but instead refers to retaining/using specific values at specific points in time.

In sum, we are persuaded that a skilled artisan would have understood that use of the word “analog” in Spencer when referring to the signal from a vinyl record that is sampled by data processor unit 200 refers to the source of the signal rather than the format of the signal (in order to distinguish it from the audio signal from a digital source such as a CD).

Accordingly, we are persuaded that, in view of Spencer’s entire disclosure, an ordinarily skilled artisan, in view of Spencer’s disclosure of transmitting digitized audio signals from turntable 100 to data processing unit 200 (Ex. 1005 ¶ 30) over USB, would have found it obvious for this transmission to be of digitized audio signals representative of music stored on a vinyl record (and that turntable 100 therefore incorporates an analog to digital converter). Furthermore, for reasons discussed above, we are persuaded that, in view of Spencer’s entire disclosure, an ordinarily skilled artisan would have found the invention obvious even in light of Spencer’s disclosures regarding sampling of analog waveforms.

For the foregoing reasons, we are persuaded that Spencer teaches or suggests an analog to digital converter as recited in limitation [1d].

Having reviewed the record in this proceeding, we determine that Petitioner has demonstrated sufficiently that the combination of Spencer and Cohen teaches limitation [1d].

3. *Limitation [1e]*

Petitioner provides evidence and arguments that the combination of Spencer and Cohen teaches:

[1e] a controller responsive to said analog to digital converter for generating an output digital audio signal of music or speech representative of an audio recording from an output of said analog to digital converter, representative of said analog audio signal.

Pet. 57–60, 68–69.

Petitioner argues that it would have been obvious to arrange a controller such as that taught in Cohen in Spencer’s turntable in a manner that satisfies this claim limitation. *Id.* at 57–58, 68–69.

We highlight the following; these highlights should not be interpreted as limiting our findings and conclusions.

For teaching a controller as claimed, Petitioner identifies Cohen’s “Microprocessor or DSP Block 20,” shown in Figure 1 of Cohen. *Id.* at 68 (citing Ex. 1006 ¶¶ 15–16). Petitioner acknowledges that, during prosecution of the ’498 patent, argument arose distinguishing Cohen from the invention—namely, the signals being converted and generated in Cohen are not audio signals as recited in the claims, but rather are MIDI timecodes. Pet. 58 (citing Ex. 1008, 310). Petitioner asserts, however, that this does not negate a finding of obviousness, and that Spencer provides the teaching of a turntable outputting audio signals. *Id.* at 57–59. As we discussed above,

supra Sec. II.F.2, we agree that Spencer teaches a turntable outputting digital audio signals. *See, e.g.*, Ex. 1005 ¶ 30.

Petitioner also argues that a USB interface, such as the USB interface of Spencer’s turntable 100, would have been understood as requiring a host controller in order to operate. Pet. 57–58; Pet. Reply 28 (citing Ex. 1002 ¶ 121; Ex. 1020, 1:55–61).

Patent Owner does not dispute that Spencer’s USB interface would have required a controller. PO Resp. 50–51. Rather, Patent Owner argues that Petitioner has not shown the combined art teaches a “controller” that satisfies Patent Owner’s proposed construction of this term. *Id.* (arguing the combination of prior art neither teaches nor suggests a “controller” that “receives a digital data stream, renders it into a specific data format, and manages the output of that formatted stream on a specific hardware interface”). However, as we discussed with regard to claim construction, *supra* Sec. II.B.2, we do not adopt Patent Owner’s construction, which is unduly narrow and not supported by the Specification of the ’498 patent.

Patent Owner also takes issue with Cohen’s host controller, arguing the claimed controller, unlike Cohen’s controller, does not control a “host.” PO Resp. 51–52.

Petitioner has shown sufficiently that the combined art teaches or suggests, or it would have been obvious, to implement a controller in Spencer that is consistent with the claimed controller.

As we discussed with regard to limitation [1d], *supra* Sec. II.F.2, Petitioner has shown sufficiently that Spencer teaches or suggests, or that it would have been obvious, for turntable 100 to include an analog to digital converter that receives an analog audio signal from a phono cartridge that is

representative of an audio recording from a vinyl record. Also discussed above with regard to limitation [1d], *supra* Sec. II.F.2, we are persuaded that Spencer teaches or suggests, or it would have been obvious, that a digital audio signal representative of an audio recording from a vinyl record is transmitted over a USB interface of turntable 100. These teachings and suggestions are sufficient to show that it would have been obvious to implement a controller in Spencer's turntable 100, because such would have been routine, and even required, in order for the USB interface to be able to transmit digitized audio signals, as disclosed in Spencer. Pet. 58 (citing Ex. 1002 ¶ 121; Ex. 1021, 1:55–61). Moreover, because the controller would have been used to transmit, over USB, digitized audio signals from an analog to digital converter that represent an audio recording from a vinyl record (*see supra* Sec. II.F.2; Ex. 1005 ¶ 30), we are persuaded the controller would have been “responsive to said analog to digital converter for generating an output digital audio signal of music or speech representative of an audio recording from an output of said analog to digital converter, representative of said analog audio signal,” as recited in limitation [1e].

We note that Patent Owner provides additional arguments in the Sur-Reply that focus on whether the host controller of U.S. Patent No. 6,801,971 (“the ’971 patent,” Exhibit 1020) would have rendered obvious the controller of claim 1. PO Sur-Reply 23–25. However, these arguments do not undermine Petitioner's position because Patent Owner's arguments go to the issue of bodily incorporation (i.e., whether the controller disclosed in the ’971 patent could have been imported into Cohen's controller, which in turn could have been imported into Spencer's turntable 100) rather than what the combined teachings would have suggested to those of ordinary skill in the

art (i.e., implementing a controller within a turntable in order to provide an output signal suitable to output over a digital output port). *In re Keller*, 642 F.2d 413, 425 (CCPA 1981). Patent Owner's arguments do not undermine Petitioner's position for the additional reason that our decision would not be different if we did not consider the '971 patent, because we find Petitioner's evidence and arguments are sufficient even without the '971 patent.

Having reviewed the record in this proceeding, we determine that Petitioner has demonstrated sufficiently that the combination of Spencer and Cohen teaches limitation [1e].

4. *Limitation [1f]*

Petitioner provides evidence and arguments that the combination of Spencer and Cohen teaches:

[1f] wherein said analog to digital converter and said controller are included within said turntable.

Pet. 69–70.

We highlight the following; these highlights should not be interpreted as limiting our findings and conclusions.

Petitioner refers to its rationale to combine Spencer and Cohen. *Id.* As we discussed above with regard to limitation [1d] and [1e], *supra* Secs. II.F.2–II.F.3, we are persuaded that Spencer teaches or suggests, or it would have been obvious, for audio signals communicated from Spencer's turntable to data processor unit 200 via USB to be digitized, which would suggest the analog to digital conversion and controller generating the corresponding USB signal are within the turntable.

We addressed both Petitioner's evidence and arguments, as well as those of Patent Owner, in our discussion regarding limitations [1d] and [1e],

supra Secs. II.F.2–II.F.3, and we do not repeat either the parties’ evidence and arguments or our findings and conclusions.

For reasons discussed above with regard to limitations [1d] and [1e], *supra* Secs. II.F.2–II.F.3, we are persuaded Spencer teaches or suggests, or it would have been obvious, to include an analog to digital converter and controller within turntable 100.

Having reviewed the record in this proceeding, we determine that Petitioner has demonstrated sufficiently that the combination of Spencer and Cohen teaches limitation [1f].

5. *Limitation [1g]*

Petitioner provides evidence and arguments that Spencer teaches:

[1g] wherein said output digital audio signal is output from said turntable and uses standard computer protocol.

Pet. 69–70.

We highlight the following; however, these highlights should not be interpreted as limiting our findings and conclusions.

Petitioner cites paragraph 30 of Spencer, which we discussed above with regard to limitation [1d]. As we discussed above, *supra* Secs. II.F.2–II.F.3, we are persuaded that Spencer teaches or suggests, or it would have been obvious, to communicate audio signals from Spencer’s turntable to data processor unit 200 via USB. Also discussed above, with regard to limitation [1g] in view of Cortellesi, *supra* Sec. II.D.5, there is no dispute amongst the parties that USB is within the scope of the phrase “standard computer protocol.” *See, e.g.*, Ex. 1001, 1:52–57 (disclosing “providing an audio conversion device to USB, firewire, or other standard computer digital communication protocol”).

Having reviewed the record in this proceeding, we determine that Petitioner has demonstrated sufficiently that Spencer teaches limitation [1g].

6. *Rationale Supporting Obviousness*

Petitioner provides a rationale in support of its obviousness arguments. Pet. 57–61. Petitioner asserts, furthermore, that Spencer and Cohen are analogous art to the '498 patent, and that a skilled artisan would have had a reasonable expectation of success in arriving at the claimed invention. *Id.* at 60–61. It appears Petitioner's position is that the only deficiencies of Spencer are lack of an express disclosure of an analog to digital converter and a controller within Spencer's turntable. Pet. 65–69. However, as discussed above with regard to limitations [1d] and [1e], *supra* Secs. II.F.2–II.F.3, Spencer suggests inclusion within the turntable of an analog to digital converter and a controller, as recited in claim 1.

Petitioner, nonetheless, identifies Cohen as explicitly teaching an analog to digital converter and controller that produces digital output from a turntable, albeit digital output in the form of MIDI signals. Pet. 57–58, 65–69. We do not re-iterate Spencer's teachings here, which as we discussed above suggest the claimed analog to digital converter and controller. We note that Cohen in no way detracts from Spencer's teachings, and provides corroboration that processing, such as analog to digital conversion, and controllers that generate digital output, were known to be implemented within turntables. The '498 patent specification further corroborates this understanding, disclosing that at the time of invention turntables already had been built with a digital interface in order to provide a digital output. Ex. 1001, 35–36 (disclosing that the "SPDIF (Sony/Phillips Digital

Interface) had been built into some turntables in order to provide a digital output”).

Patent Owner asserts that “Spencer and Cohen Do Not Disclose or Render Obvious the Limitations of the Challenged Claims,” but its evidence and arguments do not neatly fit into clear and unambiguous buckets responsive to specific arguments and evidence Petitioner provides in support of its rationale for obviousness. *See generally* PO Resp. 40–52; PO Sur-Reply 14–25. Above, *supra* Secs. II.F.1–II.F.5, we address Patent Owner’s evidence and arguments and the evidence cited therein.

7. Having reviewed and considered the evidence and arguments presented by the parties, based on the record in this proceeding, we determine Petitioner has articulated sufficient rationale that a person of ordinary skill in the art would have found claim 1 obvious in view of Cortellesi and Georges.

Dependent Claims 2 and 4–6

Petitioner argues that the combination of Spencer and Cohen teaches the recited limitations of dependent claims 2 and 4–6. *See* Pet. 70–72. Petitioner provides the testimony of Dr. Moon in support of its position. *See* Ex. 1002 ¶¶ 144–149.

Claim 2 depends from claim 1, and further specifies the standard computer protocol is USB. Ex. 1001, 3:8–9. As discussed above regarding limitation [1g] of claim 1, *supra* Sec. II.F.5, Spencer discloses USB, and Petitioner relies on USB as the standard computer protocol in arguing claim 1. For the same reasons as we discussed for claim 1, Petitioner has made a sufficient showing for claim 2.

Claims 4, 5, and 6 add a jack for outputting the output digital audio signal, configuring the turntable's rotatable platter to receive a record with an audio recording, and configuring the tonearm to engage a phonocartidge against a record with an audio recording thereon, respectively. Ex. 1001, 4:1–9. As shown by Petitioner, these claims recite elements disclosed, taught, or suggested by the combination of Spencer and Cohen, or that would have been obvious in view of these references. Pet. 70–72 (citing Ex. 1005 ¶¶ 26, 29, 30, 34, 36, Abstract; Ex. 1002 ¶¶ 144–149). The evidence cited by Petitioner shows that the additional limitations recited in claims 4–6 relate to standard features associated with a USB interface (i.e., the jack recited in claim 4) or standard features of a record player (i.e., configurations recited in in claims 5 and 6 related to playing a record) that were well known to ordinarily skilled artisans, and the combinations proposed by Petitioner amount to both the arrangement of old elements each performing the same function it had been known to perform and mere substitution of one element for another known in the field, and this arrangement/substitution yields no more than a predictable result. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007).

Patent Owner submits that “[b]ecause Sony has failed to show claim 1 is obvious over the prior art of record, Sony has therefore also failed to establish that claims dependent claims 2-6 are obvious.” PO Resp. 52. Patent Owner does not introduce additional evidence or arguments directed to dependent claims 2 and 4–6, apart from those issues discussed above with respect to independent claim 1. *Id.*

Having reviewed to record in this proceeding, we are persuaded that Petitioner has demonstrated by a preponderance of the evidence that claims

2 and 4–6 would have been obvious in view of the combination of Spencer and Cohen.

G. Obviousness over the combination of Spencer, Cohen, and Georges

Petitioner asserts unpatentability under 35 U.S.C. § 103 of claim 3 as obvious over the combination of Spencer, Cohen, and Georges. Pet. 72. Claim 3 recites “[t]he turntable of claim 1 wherein said output digital audio signal uses firewire (IEEE-1394) protocol.” Ex. 1001, 3:10–11.

Having determined that Petitioner has established by a preponderance of the evidence that claim 1 would have been obvious over the combination of Spencer and Cortellesi, *supra* Sec. II.F.1–II.F.6, the issue claim 3 raises is whether it would have been obvious to use the firewire protocol instead of the USB protocol in the system argued for claim 1.

Petitioner relies on Georges for the teaching of an output digital audio signal using firewire. Pet. 72. For example, Georges, teaches “[s]ystems and methods for creating, modifying, interacting with and playing music.” Ex. 1013, Abstract. Georges further teaches a digital signal processing module that is connected by a “high speed bus (e.g., IEEE 1394, or USB, etc.).” *Id.* ¶ 311. Petitioner provides argument and evidence that Georges is analogous art to the ’498 patent and articulates a rationale for combining Georges with Spencer and Cohen to arrive at claim 3. Pet. 50–51, 72. We are persuaded by Petitioner’s evidence and arguments that it would have been obvious to use firewire instead of USB in the system argued for claim 1, as this amounts to both the arrangement of old elements each performing the same function it had been known to perform and mere substitution of one element for another known in the field, and this

arrangement/substitution yields no more than a predictable result. *KSR Int'l Co.*, 550 U.S. at 416.

Patent Owner submits that “[b]ecause Sony has failed to show claim 1 is obvious over the prior art of record, Sony has therefore also failed to establish that claims dependent claims 2-6 are obvious.” PO Resp. 52. Patent Owner does not introduce additional evidence or arguments directed to dependent claim 3, apart from those issues discussed above with respect to independent claim 1. *Id.*

Having reviewed to record in this proceeding, we are persuaded that Petitioner has demonstrated by a preponderance of the evidence that claim 3 would have been obvious in view of the combination of Spencer, Cohen, and Georges.

III. CONCLUSION⁸

Petitioner has shown that by a preponderance of the evidence that the challenged claims are unpatentable as summarized below:

Claim(s)	35 U.S.C. §	Reference(s)/Basis	Claim(s) Shown Unpatentable	Claim(s) Not Shown Unpatentable
1, 2, 4–6	103	Cortellesi	1, 2, 4–6	

⁸ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner’s attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. See 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. See 37 C.F.R. §§ 42.8(a)(3), (b)(2).

Claim(s)	35 U.S.C. §	Reference(s)/Basis	Claim(s) Shown Unpatentable	Claim(s) Not Shown Unpatentable
3	103	Cortellesi, Georges	3	
1, 2, 4–6	103	Spencer, Cohen	1, 2, 4–6	
3	103	Spencer, Cohen, Georges	3	
Overall Outcome			1–6	

IV. ORDER

In consideration of the foregoing, it is

ORDERED that Petitioner has shown that challenged claims 1–6 of the '498 patent are unpatentable; and

FURTHER ORDERED that, because this is a Final Written Decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

IPR2023-00294
Patent 7,567,498 B2

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