

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

QSC AUDIO PRODUCTS, LLC,
Petitioner,

v.

CREST AUDIO, INC.,
Patent Owner.

Case IPR2014-00129
Patent 5,652,542

Before MIRIAM L. QUINN, GLENN J. PERRY, and BRYAN F. MOORE,
Administrative Patent Judges.

PERRY, *Administrative Patent Judge.*

FINAL WRITTEN DECISION
Inter Partes Review
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

I. INTRODUCTION

Petitioner, QSC Audio Products, LLC (“QSC” or “Petitioner”), filed a Corrected Petition (Paper 6, “Pet.”) to institute an *inter partes* review of claims 1–13 (all claims) of U.S. Patent No. 5,652,542 (Ex. 1001, “the ’542 patent”) pursuant to 35 U.S.C. §§ 311–319. Petitioner indicates that the ’542 patent is being asserted in *Crest Audio, Inc. v. QSC Audio Products, LLC*, 3:12-cv-755-FKB, filed in the United States District Court for the Southern District of Mississippi, Jackson Division, and *Crest Audio, Inc. v. QSC Audio Products, LLC*, 3:13-cv-610 DPJ-FKB, filed in the United States District Court for the Southern District of Mississippi, Jackson Division. Pet. 1.

On May 2, 2014 we granted the Petition as to claims 5 and 13 of the ’542 patent and instituted trial on one ground of unpatentability as set forth below. Paper 12, “Dec. on Inst.”

Claims	Ground	Reference
5 and 13	§ 103	Porambo ¹ , Black ² , Gittleman ³ , and Tsurushima ⁴

Patent Owner, Crest Audio, Inc. (“Crest” or “Patent Owner”) argues in the Response that, inter alia, that Gittleman is not a published reference (Paper 21, “PO Resp.”), and filed a Motion to Exclude (Paper 32, “Motion”

¹ US 5,450,624 (Ex. 1005, “Porambo”).

² WO 92/22133 (Ex. 1006, “Black”).

³ Martin Gittleman, “A Fail-Safe Audio Power Amplifier,” AUDIO ENGINEERING SOCIETY PREPRINT 835 (L-5) (1971) (Ex. 1009, “Gittleman”).

⁴ US 3,912,981 (Ex. 1010, “Tsurushima”).

or “Mot.”), seeking to exclude it as evidence. Petitioner replied (Paper 26, “Pet. Reply”) to Patent Owner’s response and opposed (Paper 35, “Opposition”) Patent Owner’s Motion to Exclude. Oral Argument was held on January 27, 2015. Paper 40, “Tr.”

The Board has jurisdiction under 35 U.S.C. § 6(c). In this Final Written Decision, issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73, we determine Petitioner has not demonstrated by a preponderance of the evidence that either claim for which trial was instituted, claims 5 and 13, is unpatentable.

II. THE ’542 PATENT (Ex. 1001)

The ’542 patent is directed to an audio amplifier with a power amplifier and a digital signal processor (“DSP”) that is capable of receiving and storing at least one algorithm that defines a signal processing function and signal processing function parameters. Ex. 1001, 6:1–7, 7:39–46. The amplifier includes a controller (microprocessor) that receives control signals from ports 206 and 208 that define a program and program data that sets the signal processing functions and function parameters for the DSP. *Id.* Microprocessor 290 gathers the controls signals and/or the signal processing programs to be loaded into the digital signal processor. *Id.*

In one embodiment, the DSP has an input for receiving the algorithm and the signal processing function parameters and an input/output port for receiving performance characteristics of the power amplifier, and for transmitting control signals for modifying the performance of the power amplifier. Ex. 1001, 5:45–55, 7:47–53. In another embodiment, the DSP calculates the impedance of a load from detected current and voltage. *Id.* at

3:25–39. In another embodiment, the DSP calculates the amount of power delivered to the load based on a detected voltage and current. *Id.*

The challenged claims, independent claims 5 and 13, are reproduced below.

5. An amplifier comprising:

a power amplifier; and

a digital signal processor capable of receiving and storing at least one of an algorithm which defines at least one signal processing function and signal processing function parameters, the digital signal processor being connected to the power amplifier;

a current detector for detecting current delivered to a load from the power amplifier and a voltage detector for detecting the voltage supplied to the load from the power amplifier, wherein the digital signal processor further comprises an input port for receiving the detected current and voltage, and wherein the current detector and voltage detector are operatively connected to the power amplifier and the digital signal processor, and wherein the digital signal processor calculates the impedance of the load.

13. An amplifier comprising:

a power amplifier; and

a digital signal processor capable of receiving and storing at least one of an algorithm which defines at least one signal processing function and signal processing function

parameters, the digital signal processor being connected to the power amplifier;

a current detector for detecting current delivered to a load from the power amplifier and a voltage detector for detecting the voltage supplied to the load from the power amplifier, wherein the digital signal processor further comprises an input port for receiving the detected current and voltage, and wherein the current detector and voltage detector are operatively connected to the power amplifier and the digital signal processor, and wherein the digital signal processor calculates the amount of power supplied to the load by the power amplifier based on the detected voltage and the detected current.

III. MOTION TO EXCLUDE

Patent Owner argued in its Response (Paper 21) and in its Motion to Exclude that Gittleman is not a “printed publication” under the patent law, and that it should be excluded from evidence.

A. Critical Date

The '542 patent issued from application 08/546,839 filed on October 23, 1995. The application is a continuation of abandoned application 08/336,481, which was filed on November 9, 1994, the critical date. Ex. 1001, cover page elements [21], [22], [63]. Therefore, to be considered “prior art,” the asserted references must have an effective date that predates the critical date of November 9, 1994.

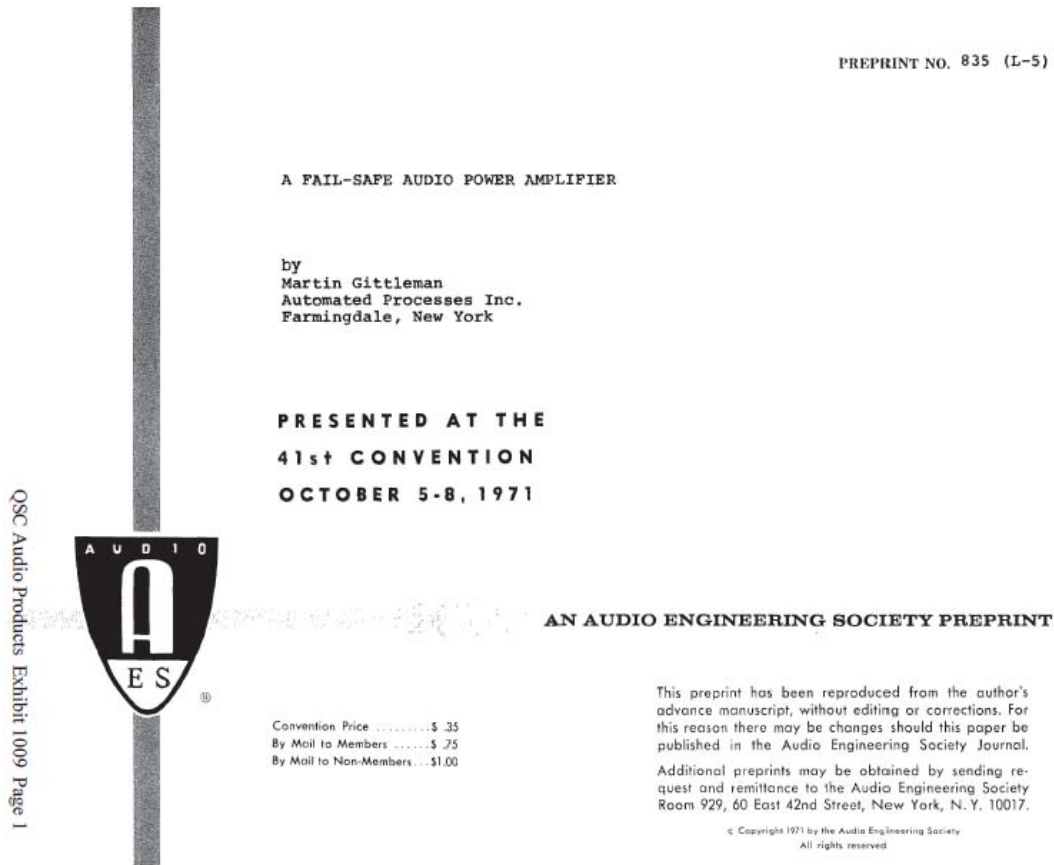
B. Authentication

Patent Owner argues that Fed. R. Evid. 901⁵ and 902⁶ prevent our consideration of Gittleman because it is not authenticated as a “publication” under the patent law. Mot. 1. Authenticating rules are intended to ensure that documents are what they purport to be. Fed. R. Evid. 901(a). One example of evidence that satisfies the authentication requirement is stated in Fed. R. Evid. 901(b)(4): “[t]he appearance, contents, substance, internal patterns, or other distinctive characteristic of the item, taken together with all the circumstances.”

⁵ Authenticating or Identifying Evidence.

⁶ Evidence that is Self-Authenticating.

The cover page of Gittleman is reproduced below. Ex. 1009, 1.



Cover page of the Gittleman reference

The cover page: (1) bears a distinctive logo of the Audio Engineering Society (AES); (2) states that the document is a “preprint” produced from an author’s advance manuscript; (3) states a unique number assigned to the preprint; (4) identifies a particular session of an AES Convention at which it was “presented;” (5) bears dates of the AES Convention at which the paper was presented; and (6) states how additional preprints may be obtained. *Id.*

With regard to the dates of the relevant AES Conventions, according to Gittleman’s cover page, the 41st AES Convention took place from October 5–8, 1971. Ex. 1009, 1.

Petitioner provides declaration testimony of Jessica King (Ex. 2004, “King Declaration”), librarian at the law firm of Petitioner’s Counsel, demonstrating that one can purchase and download copies of AES papers from the “AES E-Library” website. King Declaration, 2. Jessica King testifies that she purchased and downloaded copies of Gittleman from that website. *Id.* at 2–3. She further testifies that “search results” show that AES indicates a publication date for Gittleman as being October 1, 1971. *Id.* at 2–3.

Patent Owner argues that these search results do not authenticate Gittleman because they are inadmissible hearsay under Fed. R. Evid. 802. Mot. 2. According to Patent Owner, a “preprint” is not “self-authenticating” as a publication under Rule 902, and, therefore, Petitioner must produce evidence sufficient to support a finding that a “preprint” is, indeed, a “printed publication.” *Id.* at 1–2.

Petitioner disagrees and argues that to authenticate Gittleman Petitioner simply “must produce evidence sufficient to support a finding that the item is what the [Petitioner] claims it is.” Opposition, 1 (citing Fed. R. Evid. 901(a)). In support of this position, Petitioner points to the layout, AES logo, and boilerplate language on the front page of Gittleman to authenticate these exhibits under Rule 901(b)(4). Opposition, 2–4. Furthermore, the various indicia on the Gittleman cover page are similar to the indicia found on the Cordell paper (Ex. 1016) presented at the 72nd AES Convention, as testified to by Patent Owner’s expert. See Ex. 1016, 1.

Patent Owner’s arguments conflate two separate issues — (1) whether Gittleman is authentic, and (2) whether it constitutes a publication under the patent law. Gittleman includes the AES logo. The cover page further

identifies a specific address for AES for the purpose of obtaining additional preprints, and states that reproduction of the article is prohibited without permission from the Audio Engineering Society Journal. Ex. 1009. There is no dispute that this document is a preprint of a paper intended for presentation at their respective AES conventions. Therefore, having considered and weighed the distinctive characteristics of the article and the circumstances surrounding its retrieval from the AES E-Library, we find that Gittleman is what it appears to be — a paper categorized by the Audio Engineering Society as a “preprint.” Petitioner has met its authentication burden under Fed. R. Evid. 901 and 902. Whether the self-authenticated “preprint” qualifies as a “publication” under the patent law is a separate matter.

C. Hearsay

Because the only grounds of unpatentability a petitioner may raise in an *inter partes* review are those based on prior art consisting of patents or printed publications (35 U.S.C. § 311(b)) and because printed publications must have been published before the critical date of the challenged patent in order to constitute prior art, we must determine whether Gittleman was published before November 9, 1994, the critical date. To prove the publication date of Gittleman, Petitioner relies on the information printed on the cover page of this preprint, namely that it was “presented” at an AES convention in 1971. See Pet. 4. Patent Owner argues that Gittleman should be excluded because the statement of dates on the cover page, e.g., “PRESENTED AT THE 41ST CONVENTION OCTOBER 5–8, 1971” on the cover of Gittleman, is hearsay evidence attempting to establish a date of publication. Mot. 3 (citing Fed. R. Evid. 802).

Petitioner argues that Patent Owner's challenges under Fed. R. Evid. 802 fail because the statement is not hearsay—Gittleman has been authenticated as a “conference paper that was published as of the date shown on the cover page, [and] Petitioner is not relying on the statement that appears on the face of the Gittleman paper for the truth of the matter asserted.” Opposition 7. Alternatively, Petitioner argues that even if the statement was hearsay, it would come within the ancient documents (Fed. R. Evid. 803(16)) or the residual hearsay (Fed. R. Evid. 807) exceptions to the hearsay rule. *Id.* at 8–10.

We are not persuaded by Petitioner's argument that the statement is not hearsay. Although Gittleman has been authenticated as a preprint maintained by AES, Petitioner relies on the truth of the matter asserted on the face of the preprint, i.e., that it was presented at the AES convention on the date stated on the cover page. Without the statement, there is no evidence that Gittleman actually was available, as a printed publication, at the convention or on any other particular date. We note that Patent Owner does not argue that this document was not associated with the AES convention. The question for us to decide is whether Petitioner has provided sufficient evidence and argument showing that the statement relied on is admissible under an exception to the hearsay rule. We find that, in this situation, the statement should not be excluded as hearsay, because it comes within two separate exceptions to the hearsay rule.

The preprint qualifies as an ancient document subject to Fed. R. Evid. 803(16), which applies to documents that are at least 20 years old and whose authenticity is established. Per our discussion above, Gittleman is

authenticated. The Gittleman preprint purports to have been presented October 5–8, 1971, more than 20 years ago. Ex. 1009, 1.

The preprint also meets the circumstances outlined in Fed. R. Evid. 807, the residual exception to hearsay. To qualify for the residual exception under Fed. R. Evid. 807, four requirements must be met: (1) the statement has equivalent circumstantial guarantees of trustworthiness; (2) it is offered as evidence of a material fact; (3) it is more probative on the point for which it is offered than any other evidence that the proponent can obtain through reasonable efforts; and (4) admitting it will best serve the purposes of these rules and the interests of justice. Fed. R. Evid. 807. Petitioner argues persuasively that the four requirements are met. Opposition 9–11. For example, Petitioner argues circumstantial guarantees of trustworthiness by virtue of all the indicia on the cover page of the document showing it is a genuine preprint of the AES obtained from the organization’s repository of similarly categorized preprints. *Id.* Petitioner also argues that the statement is evidence of a material fact: convention date set forth on the preprint. *Id.* Furthermore, Petitioner argues that the date on the cover page is more probative than other documents Petitioner has obtained through reasonable efforts. *Id.* (pointing to the website listing of alleged publication dates that Patent Owner has challenged as inadmissible hearsay). Finally, Petitioner argues, and we agree, that admitting the statement as evidence of the date of publication serves the interest of justice. *Id.* Although we recognize that Petitioner had other avenues of proving this statement was not hearsay, such as by obtaining evidence from AES regarding the custody of its electronic documents, our concern with ensuring trustworthiness and accuracy of documents admitted in evidence has been alleviated. For example,

Petitioner has provided AES website documents (also self-authenticated) that corroborate similar dates as those stated on the cover page of the reference. Furthermore, the dates of the documents cited within the reference are all before the date of the stated presentation of the document. Yet another fact we consider is that the cover pages of all the AES preprints submitted into evidence have the same information, and sufficient detail regarding the AES convention and the manner in which the preprints may be obtained. *See also* Ex. 1015, 90:18–92:10 (Mr. Cordell testifying that his own article was sold and distributed by AES at the AES convention at which he presented the paper).

Based on the foregoing, and after a careful review of the proffered evidence and arguments, we find that the statement on the cover page of Gittleman regarding presentation of the preprint at the particular AES convention is admissible.

D. Conclusion

For reasons stated above, Patent Owner's Motion to Exclude is denied.

IV. ANALYSIS OF CLAIM CHALLENGES

A. Gittleman is a Publication

Patent Owner argues that Gittleman is not a "publication" within the meaning of the patent law. The touchstone of whether a particular document is a publication under the patent law is whether it was available to those of ordinary skill in the art to which it pertains.

The evidence, including the Cordell deposition testimony, suggests strongly that it is the custom and practice of the AES to prepare and

distribute preprints of its convention presentations at a facility at the convention.

The evidence further suggests that the AES makes available for purchase, via its library website, copies of convention presentations after they have been presented so that all interested persons may obtain copies of documents presented at its conventions.

We conclude from the totality of evidence that the Gittleman preprint was made available to attendees of their respective AES Conventions. We further conclude that the Gittleman AES convention took place prior to the critical date. Thus, Gittleman was accessible to those of ordinary skill as of the stated convention date, well before the critical date. We, therefore, conclude that Gittleman is a publication within the meaning of the patent law.

We note that Patent Owner challenged the sufficiency of the evidence presented by Petitioner, but did not offer any evidence that Gittleman is not a publication. Based on the evidence and arguments presented on the record before us, we conclude that Petitioner has shown by a preponderance of the evidence that Gittleman is a publication within the meaning of the patent law.

B. Level of Ordinary Skill

Petitioner asserts that a person of ordinary skill in the art would have had the following education and experience: Master of Science degree in Electrical Engineering and at least some practical experience with the design and testing of electronic amplifiers. Ex. 1003 ¶ 15. Patent Owner's declarant agrees generally with the above assertion, asserting that a person of ordinary skill in the art would have had one year of experience with the

design and testing of electronic amplifiers. Ex. 2001 ¶ 27. The disagreement appears to be that the Petitioner asserts that a person of ordinary skill would be aware of amplifier designs useful at frequencies ranging from audio frequencies to radio frequencies (RF) (Ex. 1003 ¶ 16), while Patent Owner asserts that a person of ordinary skill would not have practical experience with amplifier designs useful at frequencies ranging from audio frequencies to radio frequencies (RF) (Ex. 2001 ¶¶ 28–30). We credit Petitioner’s declarant, and agree that a person of ordinary skill would be at least aware of amplifier designs useful at radio frequencies (RF) based at least on that person’s educational background. Ex. 1003 ¶ 16.

We determine the obviousness issues guided by the evidence of the level of ordinary skill in the art presented by the references themselves. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001). From the Porambo reference, which Patent Owner does not contest is in the field of endeavor of the invention in question, we understand that the level of ordinary skill in the art, at a minimum, pertains to audio amplifiers and the incorporation of DSPs in audio amplifiers. *See* Ex. 1005, Abstract (describing the features of the audio amplifiers and DSPs at issue in Porambo).

C. Dr. Ellis’s Qualification to Provide Expert Opinions

Patent Owner argues that Petitioner’s declarant, Dr. Ellis, is not “credible” to perform as an expert in this case because of his lack of experience designing audio power amplifiers pointing to: (1) his alleged lack of experience designing audio amplifiers (PO Resp. 17–20); (2) an alleged bias toward DSP solutions (PO Resp. 20–23); (3) his alleged use of the wrong standard for obviousness (PO Resp. 23–24); (4) his alleged lack

of knowledge of RF Amplifiers (PO Resp. 24–26); and (5) the alleged short amount of time he spent reviewing this case (PO Resp. 26–29). Patent Owner argues that, unlike Dr. Ellis, its declarant Bob Cordell has significant practical experience designing audio power amplifiers at the time of invention. Ex. 2001 ¶¶ 26–27.

As to his audio amplifier experience, Dr. Ellis completed a Master of Science degree in Electrical Engineering with numerous years of experience as a research assistant researching audio signal processing, sound synthesis and analysis. Ex. 1004, 1. Dr. Ellis stated during his deposition that, although he is an expert in digital signal processing (Ex. 2002, 154:15–16), he has experience in the design of amplifiers from his undergraduate education. *Id.* at 124:7–20. Dr. Ellis designed and tested microphone amplifiers as a post-doctoral student at the Computer Science Institute at Berkeley, *id.* at 111:13–113:4, and is currently designing amplifiers that can drive speakers with the goal of incorporating these into his professional work. *Id.* at 120:4–121:12. We also note, as discussed above, the field of the '542 patent invention is related to audio amplifiers generally and the incorporation of DSPs. We find that although Dr. Ellis is less qualified than Mr. Cordell in the area of amplifier design, he is qualified sufficiently to testify about audio amplifiers as they relate to DSPs.

As to his alleged bias, Patent Owner points to Dr. Ellis's testimony that "DSP revolution" has occurred, where DSP solutions were preferred over analog solutions. PO Resp. 20–23. We do not agree with Patent Owner that this indicates that he is biased toward believing that "any DSP application that replaces an analog application is obvious." *See* PO Resp. 23.

As to his alleged use of the wrong standard for obviousness, Patent Owner argues that Dr. Ellis did not evaluate the prior art from the perspective of a person having ordinary skill in the art *at the time of invention* because apparently he did not use the words “at the time of invention” when discussing the standard in his declaration. PO Resp. 23–24. We are not persuaded by this argument.

Patent Owner also argues that Dr. Ellis must himself be a person of ordinary skill in the art. PO Resp. 24. Patent Owner’s arguments are unpersuasive because, to testify as an expert under FRE 702, a person need not be a person of ordinary skill in the art, but rather “qualified in the pertinent art.” *Sundance, Inc. v. DeMonte Fabricating Ltd.*, 550 F.3d 1356, 1363–64 (Fed. Cir. 2008); *see SEB S.A. v. Montgomery Ward & Co., Inc.*, 594 F.3d 1360, 1372–73 (Fed. Cir. 2010); *Mytee Prods., Inc. v. Harris Research, Inc.*, 439 F. App’x 882, 886–87 (Fed. Cir. 2011) (non-precedential) (upholding admission of the testimony of an expert who “had experience relevant to the field of the invention,” despite admission that he was not a person of ordinary skill in the art). As noted above, Dr. Ellis is qualified in the pertinent art.

Patent Owner argues that Dr. Ellis’s lack of knowledge regarding class C RF amplifiers renders his opinions of little or no credibility. PO Resp. 25. Patent Owner has not explained how specific knowledge of the characteristics of class C RF amplifiers is directly relevant to the issues in this case as opposed to a general knowledge of RF amplifiers. Thus, we are not persuaded that Dr. Ellis’s alleged lack of this particular knowledge renders his opinions of little or no credibility.

Finally, Patent Owner argues that Dr. Ellis spent an unreasonably short amount of time reviewing this case before providing his opinion, i.e. only ten hours. PO Resp. 26–29. We find that the amount of time Dr. Ellis chose to spend with the case is likely based on his experience with the subject matter and the difficulty of the subject matter. Thus, we are not persuaded by Patent Owner’s argument that the time spent on the proffered opinion affects the weight we give his opinions.

D. Claim Construction

In an *inter partes* review, claim terms in an unexpired patent are given their broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b). Under the broadest reasonable construction standard, claim terms are given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art in the context of the entire disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). Any special definition for a claim term must be set forth with reasonable clarity, deliberateness, and precision. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994).

The following claim constructions apply.

1. *at least one of an algorithm which defines at least one signal processing function and signal processing function parameters (claims 5 and 13)*

As to the claim term “at least one of an algorithm which defines at least one signal processing function and signal processing function parameters,” Petitioner argues that “[t]he use of the phrase ‘at least one of an’ in the independent claims makes it clear that the DSP has to be capable

of receiving an algorithm or signal processing function parameters or both.”
Pet. 13.

Petitioner points out that the Specification discloses that “[t]he microprocessor **290** gathers control signals and/or signal processing programs to be loaded into the digital signal processor.” Ex. 1001, 5:25–27. This quotation, however, simply notes that the DSP can load control signals or signal processing programs. The Specification also notes that “[t]he control signals input from the ports **206** and **208** define a program [function] and program data [parameters] that sets the signal processing functions and function parameters.” *Id.* at 22-25. Thus, the Specification suggests that both the functions and parameters are transmitted to the DSP.

Additionally, the Federal Circuit, when faced with similar claim language, determined that the phrase “at least one” followed by a list of categories separated by “and,” rather than “or,” suggests a conjunctive list in which each one of the members of the list is necessary to satisfy the claim. *SuperGuide Corp. v. DirecTV Enters., Inc.*, 358 F.3d 870, 885–86 (Fed. Cir. 2004) (“A common treatise on grammar teaches that ‘an article of a preposition applying to all the members of the series must either be used only before the first term or else be repeated before each term.’” (quoting William Strunk, Jr. & E.B. White, *The Elements of Style* 27 (4th ed. 2000))). *SuperGuide* points out that each term in the list embraces a different category, each of which must take on a chosen value: “Every disclosed embodiment teaches that the user must choose a value for each designated category.” *Id.* at 887. That is the case here, where functions have associated parameters.

For the above reasons, consistent with the plain English meaning and the Specification, we construe “at least one of an algorithm which defines at least one signal processing function and signal processing function parameters” to require that both a signal processing function and a signal processing parameter must be present in the prior art to meet that claim limitation.

2. power amplifier (claims 5 and 13)

Patent Owner argues that the phrase “power amplifier” means “an electronic circuit that amplifies low-power audio signals to a level suitable for driving loudspeakers.” PO Resp. 13. Patent Owner argues that the field of the invention is audio amplification, and that the abstract of the ’542 patent “contemplates the processing of audio signals as the purpose of the invention for playback via a loudspeaker.” *Id.* at 13–14.

Under a broadest reasonable interpretation, words of the claim must be given their plain meaning unless the plain meaning is inconsistent with the specification. *In re Zletz*, 893 F.2d 319, 321 (Fed. Cir. 1989). Limitations from the specification are not to be read into the claims. *In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993); *see also Superguide*, 358 F.3d at 875 (“Though understanding the claim language may be aided by the explanations contained in the written description, it is important not to import into a claim limitations that are not part of the claim. For example, a particular embodiment appearing in the written description may not be read into a claim when the claim language is broader than the embodiment.”); *cf. Merck & Co., Inc. v. Teva Pharm. USA, Inc.*, 395 F.3d 1364, 1372 (Fed. Cir. 2005) (reversing the district court's construction of the term “about” because the interpretation was inconsistent with the specification).

The preferred embodiment of the '542 patent is directed to processing audio signals for playback to loudspeakers, but claims 5 and 13 are broader in scope, and do not recite loudspeakers or audio signals. Therefore, we decline to limit the term “power amplifier” as Patent Owner suggests. We find that the term “power amplifier” does not need explicit construction in this case.

3. a digital signal processor capable of receiving and storing (claims 5 and 13)

Patent Owner argues that the phrase “a digital signal processor capable of receiving and storing” should be given its plain and ordinary meaning. PO Resp. 14. Patent Owner argues that, because that claims recite “an amplifier comprising . . . a digital signal processor,” “the digital signal processor must be installed in the amplifier when it receives and stores. So, the ‘capable of receiving and storing’ limitation occurs in the amplifier.” *Id.* at 14. We disagree.

Claims 5 and 13 are not method claims, and are silent as to when the “capability to receive” must occur. Additionally, the claims are silent as to the physical configuration of the components of the amplifier. We decline to limit the term a “digital signal processor capable of receiving and storing” as Patent Owner suggests. Therefore, we find that the term “digital signal processor capable of receiving and storing” does not require the digital signal processor must be installed in the amplifier when it receives and stores.

E. Overview of Prior Art References

Porambo discloses an amplifier with programmable DSP chipset 28 that has an input for receiving and storing a speaker testing function, as well

as threshold values that are used to detect if speakers are properly connected. Ex. 1005, 5:21–25, 6:18–22. During testing, DSP chipset 28 receives a clipping signal produced by a power amplifier, and, based on that signal, transmits modified testing signals. *Id.* at 5:1–20. Thus, DSP chipset 28 reduces distortion in the power amplifier by ensuring that the modified testing signals are within a range that avoids such distortion. *Id.*

Black discloses an amplifier with an output protection circuit that includes a DSP. The DSP is programmed to keep the power amplifier out of saturation in order to protect the power amplifier and increase its efficiency. Ex. 1006, 3:22–26, 9:12–25. Black discloses that the DSP has an input/output port that receives a signal indicative of amplifier saturation on line 233 and an input/output port (feeding D/A (Digital to Audio Converter) 221) that transmits control signals to D/A 221 for lowering input signal 231, thus ensuring that the amplifier does not reach a saturation level. *Id.* at 9:12–25, Fig. 2.

Gittleman illustrates the process of monitoring output current and voltage in a feedback loop to control amplifier gain. Ex. 1009, Fig. 1. In Gittleman, a limiting circuit senses potentially unsafe conditions of the output voltage, current, and temperature, and limits the dissipation of the output transistors to an acceptable level. *Id.* at 4.

Tsurushima illustrates a protection circuit for an audio amplifier that operates based on detected output voltage and current levels. Tsurushima discloses an amplifier having circuit 14 that detects output current and voltage in order to determine the impedance of a load. When the impedance drops below a predetermined value, switching circuit 15 in the amplifier is closed, which removes essentially the input from the output stage of the

amplifier in order to protect it from overloading. Ex. 1010, 8:63–68, 9:1–7, 10:33–40.

F. Independent Claims 5 and 13

Our substantive inquiry focuses on whether the record before us presents sufficient evidence for us to conclude that, at the time of the '542 patent invention, it would have been obvious to a person of ordinary skill in the relevant art to have a DSP in combination with a power amplifier, where the DSP receives a digital signal processing function and parameters and also receives detected current and voltage to calculate impedance or power. We are not persuaded that the evidence and arguments presented show by a preponderance of the evidence that the combination would have been obvious.

Claims 5 and 13 further recite:

a current detector for detecting current delivered to a load from the power amplifier and a voltage detector for detecting the voltage supplied to the load from the power amplifier,
wherein the digital signal processor further comprises an *input port for receiving the detected current and voltage*, and
wherein the current detector and voltage detector are operatively connected to the power amplifier and the digital signal processor.

Emphasis added. The detected current and voltage are then used to calculate either impedance (claim 5) or power (claim 13).

Petitioner asserts that both Gittleman's and Tsurushima's disclosure of detecting the output current and voltage of an amplifier to provide output protection meets a portion of this limitation. Pet. 38–39 (citing Ex. 1009, 4, Fig. 1; Ex. 1010, 8:62–68). Petitioner further asserts that Tsurushima's

disclosure of a voltage and current detection circuit that is connected to a power amplifier meets another portion of this limitation. *Id.* at 39 (citing Ex. 1010, Fig. 6).

Petitioner admits that neither of the references with a DSP (Porambo and Black) teaches a voltage and current value being input into that DSP. Tr. 49:17–21. Rather, Porambo and Black teach a binary, yes-no, indication input into the DSP. Ex. 2002, 198:13–199:2; Ex. 2001 ¶¶ 137, 149. Petitioner asserts that the detection circuit of either Gittleman or Tsurushima could be combined with input in Black that monitors the power output of the amplifier, thus creating an operable connection between the amplifier, the DSP, and the detectors, as required by claims 5 and 13. Pet. at 32–33, 37 (citing Ex. 1006, 8, 10–25).

Patent Owner argues that Porambo and Black simply infer the voltage or saturation level at the power amplifier, rather than detect voltage. PO Resp. 37. Patent Owner, through its declarant, argues that a person of ordinary skill in the art would not break the internal connections and reconnect them to a DSP because the V-I limiter of Tsurushima is preconfigured to detect a specific voltage. PO Resp. 39. Additionally, Patent Owner, through its declarant, argues that Gittleman simply detects internal currents in the amplifier and uses them to protect the amplifier. PO Resp. 41–42.

Petitioner disagrees. Petitioner's declarant Dr. Ellis states that:

[I]t is basic electrical engineering that the output power of an amplifier can be computed from the product of its output current and output voltage. Black teaches that output power of an amplifier can be monitored by a DSP and used to provide output protection for the power amplifier. A person of ordinary skill in the art would have been motivated to use the output

current and voltage as disclosed in Gittleman or Tsurushima as a way of detecting the output power of the amplifier from its output current and output voltage.

Ex. 1003 ¶ 65. The question before us is whether one of ordinary skill in the art would take the analog output protection circuits and access the detected current and voltage inside those circuits, then input them into the DSP of Porambo or Black, rather than use the output protection scheme already disclosed in Black.

Petitioner analogizes this case to *Leapfrog Enters., Inc. v. Fisher-Price, Inc.*, 485 F.3d 1157 (Fed. Cir. 2007) (“*Leapfrog*”). In particular, Petitioner points out the Federal Circuit’s statement that “[a]ccommodating a prior art mechanical device that accomplishes that goal to modern electronics would have been reasonably obvious to one of ordinary skill.” *Id.* at 1161.

We note that in *Leapfrog*:

the goal of the [claimed] device was to allow a child to press a switch associated with a single letter in a word and hear the sound of the letter as it is used in that word. In this way, the child would both associate the sound of the letter with the letter itself and be able to sound out the word one letter at a time to learn to read phonetically.

Id. The prior art in *Leapfrog* accomplished this same task except the switch activated a phonograph rather than activating an electronically created sound. *Id.* Here the prior art does not perform an identical task. Claims 5 and 13 require detecting voltage and current values for the purpose of making a calculation. None of the cited references perform this task digitally or in analog.

As noted above, Petitioner's declarant has more experience related to DSPs while Patent Owner's declarant has more experience with audio power amplifiers. As to whether it would be obvious to modify an existing output protection scheme in a power amplifier, we credit the analysis and opinions of Patent Owner's declarant.

The law allows for us to apply common sense in deciding if a missing limitation nonetheless would have been arrived at by a person of ordinary skill in the art. *See Perfect Web Techs., Inc. v. InfoUSA, Inc.*, 587 F.3d 1324, 1329 (Fed. Cir. 2009) (In *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007), "the Supreme Court instructed that factfinders may use common sense in addition to record evidence."). "[A] person of ordinary skill is also a person of ordinary creativity." *KSR*, 550 U.S. at 421. Here, however, the missing limitation is not a matter of common sense. For example, Black has been shown to have no need for a DSP that detects voltage and current values for calculating impedance or power, because Black infers a saturation level at the power amplifier stage. Implementing changes to Black's DSP to achieve the claim limitation requires a modification that, we find, goes beyond a common sense application and presents the question of what would motivate such a modification. On this last point, we find that Petitioner has not shown by a preponderance of the evidence a rationale for receiving the recited values in order to perform a calculation. Petitioner does not point to a motivation to replace or modify the scheme of Black or Porambo with the '542 patent's scheme of detecting current and voltage to perform calculations of power and impedance. "Where . . . the necessary reasoning is absent, we cannot simply assume that 'an ordinary artisan would be awakened to modify prior art in such a way as to lead to an obviousness

rejection.”” *Plantronics, Inc. v. Aliph, Inc.*, 724 F.3d 1354, 1353 (Fed. Cir. 2013) (citation omitted).

Thus, upon review of Petitioner’s analysis and supporting evidence and Patent Owner’s analysis and evidence in rebuttal, we determine that Petitioner has not shown by a preponderance of the evidence that claims 5 and 13 would have been obvious over the combination of Gittleman, Tsurushima, Porambo, and Black.

V. CONCLUSIONS

For the reasons set forth above, we are persuaded that Petitioner has shown by a preponderance of the evidence that Gittleman is a publication within the meaning of the patent law but has not shown by a preponderance of the evidence that claims 5 and 13 are unpatentable under 35 U.S.C. § 103(a) as obvious over Porambo, Black, Gittleman, and Tsurushima.

VI. ORDER

Accordingly, it is

ORDERED that Patent Owner’s Motion to Exclude is *denied*;

FURTHER ORDERED that Petitioner has not demonstrated by a preponderance of the evidence that claims 5 and 13 of U.S. Patent 5,652,542 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.

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Patent 5,652,542

FOR PETITIONER:

Rodney C. Tullett
Chun M. Ng
Kaustuv Das

PERKINS COIE LLP

RTullett@perkinscoie.com
CNg@perkinscoie.com
KMDas@perkinscoie.com

FOR PATENT OWNER:

N. Andrew Crain
Robert Gravois
Kenneth Knox
Vivek A. Ganti

THOMAS | HORSTEMEYER, LLP

andrew.crain@thomashorstemeyer.com
robert.gravois@thomashorstemeyer.com
kenny.knox@thomashorstemeyer.com
vivek.ganti@thomashorstemeyer.com