

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

HARMONIX MUSIC SYSTEMS, INC.,
Petitioner,

v.

PRINCETON DIGITAL IMAGE CORPORATION,
Patent Owner.

Case IPR2014-00155
Patent 5,513,129

Before BENJAMIN D. M. WOOD, MICHELLE R. OSINSKI, and
TRENTON A. WARD, *Administrative Patent Judges*.

OSINSKI, *Administrative Patent Judge*.

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

I. BACKGROUND

Harmonix Music Systems, Inc. (“Petitioner”) filed a corrected Petition (Paper 4, “Pet.”) requesting *inter partes* review of claims 1, 5, 6, 8–13, 15–19, and 21–23 of U.S. Patent No. 5,513,129 (Ex. 1001, “the ’129 patent”). On May 9, 2014, pursuant to 35 U.S.C. § 314, we instituted an *inter partes* review of claims 10, 11, 22, and 23 on the following grounds of unpatentability asserted by Petitioner:

Reference	Basis	Claims
Pocock-Williams ¹	§ 102(b)	10, 11, 22, and 23
Fallacaro ²	§ 102(b)	10, 11, 22, and 23

Decision to Institute (Paper 11, “Dec. Inst.”), 6, 22.

Princeton Digital Image Corporation (“Patent Owner”) filed a Patent Owner Response (Paper 18, “PO Resp.”), and Petitioner filed a Reply (Paper 20, “Pet. Reply”). Patent Owner did not file a motion to amend claims.

Petitioner relies on the declaration of Dr. Michael Zyda in support of its Petition (Ex. 1020). Patent Owner relies on the declaration of Dr. Jay P. Kesan (Ex. 2006) in support of its Response. Petitioner and Patent Owner both refer to the deposition testimony of Dr. Zyda (Ex. 1022; Ex. 2005) and Dr. Kesan (Ex. 1024; Ex. 2008).

We heard oral argument on January 15, 2015. A transcript is entered as Paper 25 (“Tr.”).

We have jurisdiction under 35 U.S.C. § 6(c). This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73.

We determine Petitioner has shown by a preponderance of the

¹ Lynn Pocock-Williams, *Toward the Automatic Generation of Visual Music*, Leonardo 25, No. 1, 29–36(1992) (Ex. 1007).

² Fallacaro et al., US 4,771,344 (issued Sept. 13, 1988) (Ex. 1005).

evidence that claims 10, 11, 22, and 23 of the '129 patent are unpatentable under 35 U.S.C. § 102(b).

A. Related Proceedings

The parties indicate that the '129 patent has been asserted by Petitioner in the following district court cases: *Princeton Digital Image Corp. v. Harmonix Music Sys., Inc.*, No. 1:12-cv-01461 (D. Del.); *Princeton Digital Image Corp. v. Ubisoft Entm't SA*, No. 1:13-00335 (D. Del.); and *Princeton Digital Image Corp. v. Activision Publ'g Inc.*, No. 2:12-cv-01134 (C.D. Cal.), dismissed. Pet. 3; Paper 7 (Patent Owner's Mandatory Notices), 1–2; Ex. 1002.

Petitioner also identifies *Ubisoft Entertainment SA v. Digital Image Corp.*, IPR2014-00635, filed on April 15, 2014, and involving the '129 patent, as a related matter. Paper 10, 1.

B. The '129 Patent

The '129 patent relates to a computer system, and methods for controlling a computer system, that utilize audio signals. Ex. 1001, 29:1–64, 29:65–30:65. A component of the computer system referred to as an “Acoustic Etch,” can retrieve music (in electronic, acoustic, or optical form) and process it to generate control signals that are used by the computer system. *Id.* at 4:54–59, 4:63–67. For example, the Acoustic Etch can “extract a rhythm signal indicative of the beat of some frequency band of the music . . . or of some other parameter of a frequency band of the music.” *Id.* at 5:4–7. Control signals are generated therefrom to control the rhythm of a moving virtual object, for example. *Id.* at 5:7–10.

The Acoustic Etch also can supply prerecorded control tracks or generate control signals from prerecorded control tracks. *Id.* at 5:11–17.

“The control tracks can be generated automatically (e.g., by electronic signal processing circuitry) in response to a music signal and then recorded, or can be generated in response to manually asserted commands from a person (while the person listens to such music signal) and then recorded.” *Id.* at 5:21–26.

Figure 2 of the '129 patent is reproduced below:

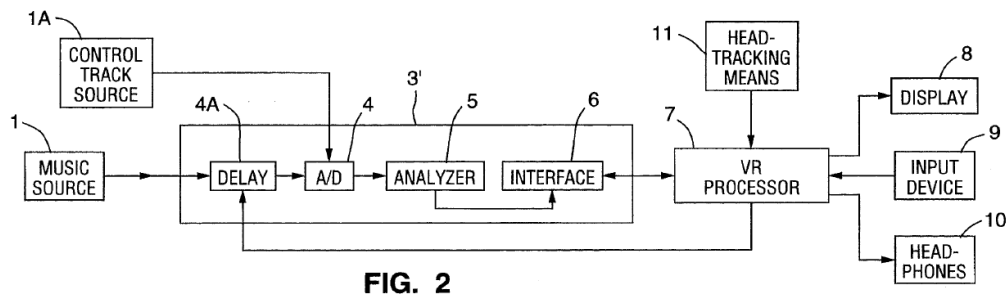


Figure 2 above depicts a diagram of an exemplary computer system in which a control track is recorded on, and played back from, first medium 1A, e.g., a video game cartridge, and a corresponding music signal is recorded on, and played back from, second medium 1, e.g., a compact disk (“CD”). *Id.* at 8:58–65. Analog-to-digital conversion circuit 4 within Acoustic Etch 3' receives and digitizes the control track from first medium 1A and the music signal from second medium 1. *Id.* at 8:33–35. Analyzer 5 within Acoustic Etch 3' receives the digitized output and generates control signals by processing the control track and music signal, and outputs the control signals through interface 6 to VR³ processor 7. *Id.* at 8:38–42. VR processor 7 “is a computer programmed with software for implementing a virtual environment” and “can cause image data representing a virtual environment to be displayed on display device 8.” *Id.* at 8:1–4. VR processor 7 uses the

³ VR will be used to denote “virtual environment,” or “virtual world.”
Ex. 1001, 1: 20–33.

control signals to control generation of the virtual environment. *Id.* at 8:41–44.

Figure 5 of the '129 patent is reproduced below:

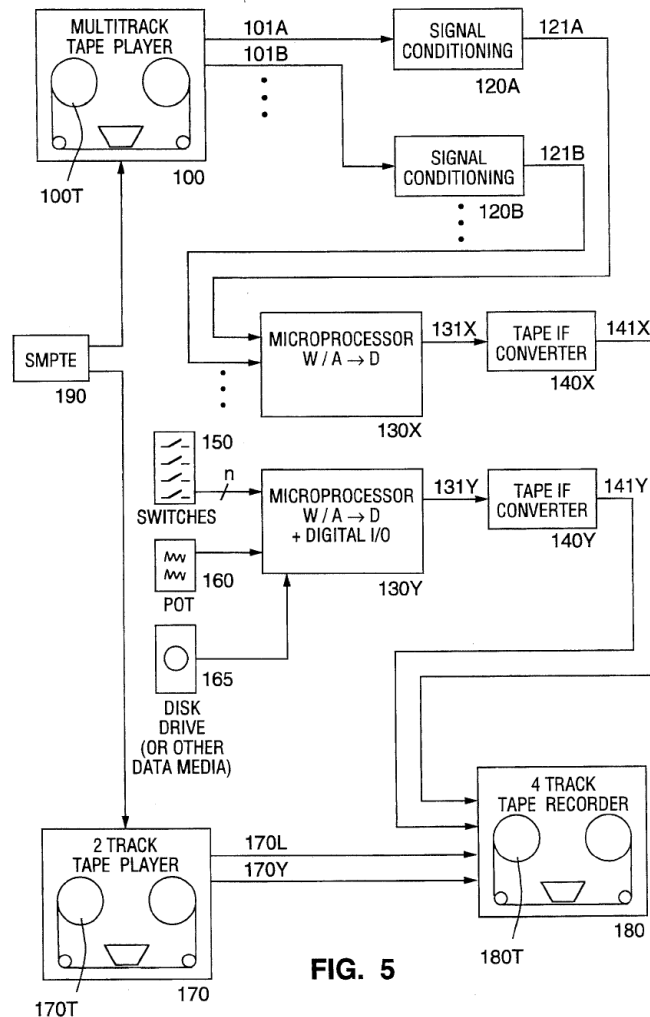


Figure 5 above depicts “a block diagram of a system for creating an audio tape with control tracks.” *Id.* at 7:29–31. In Figure 5, multitrack tape player unit 100 is loaded with master tape 100T and outputs music signals 101A, 101B. *Id.* at 13:11–15. Signal conditioners 120A, 120B comprise electronic circuitry that receive music signals 101A, 101B and output analog control signals 121A, 121B. *Id.* at 13:16–19. Analog control signals 121A, 121B are fed to microprocessor 130X that is programmed with software for

generating a control track from conditioned signals 121A, 121B. *Id.* at 13:19–26. Microprocessor 130X outputs a serial data stream to tape interface (“IF”) converter 140X, which comprises electronic circuitry to output data signal 141X that is of the type that can be stored on standard audio magnetic tape. *Id.* at 13:26–30. Data signal 141X, indicative of the control track generated by microprocessor 130X, is fed to four-track audio tape recording unit 180 that is loaded with four-track audio cassette tape 180T. *Id.* at 13:27–31.

Figure 5 also illustrates assembly of switches 150 “by which a human operator can input digital signals” and “feeds parallel digital data to microprocessor 130Y.” *Id.* at 13:33–36. “Microprocessor 130Y is also programmed with software for generating a control track in response to the input data it receives, and outputs a serial data stream to tape IF converter 140Y,” which comprises electronic circuitry to output data signal 141Y which is of the type that “can be stored on standard audio magnetic tape.” *Id.* at 13:42–48. Data signal 141Y, indicative of the control track generated by microprocessor 130Y, is fed to four-track audio tape recording unit 180. *Id.* at 13:45–48.

Figure 5 also illustrates two-track tape playing unit 170 loaded with master tape 170T that is time-synchronized with multitrack tape player unit 100 through SMPTE synchronizer 190. *Id.* at 13:49–52. Two-track tape playing unit 170 outputs left and right audio signals 170L, 170R to four-track audio tape recording unit 180. *Id.* at 13:53–55. In this way, four-track audio cassette tape 180T contains audio signals 170L, 170R (which are typically music signals) and “two other tracks containing control tracks corresponding to the audio signals.” *Id.* at 13:56–59.

C. Illustrative Claims

The challenged independent claims 10 and 22 are illustrative of the claimed subject matter and are reproduced below:

10. A method for controlling a computer system, including the steps of:

- (a) prerecording a control track having audio and/or control information corresponding to an audio signal; and
- (b) operating the computer system in response to said prerecorded control track.

22. A computer system, including:

means for prerecording a control track having audio and/or control information corresponding to an audio signal; and
a processor which receives the control track and which is programmed with software for operating the computer system in response to said control track.

Ex. 1001, 29:53–59, 30:54–60.

II. ANALYSIS

A. Claim Construction

The '129 patent expired on July 14, 2013. “[T]he Board’s review of the claims of an expired patent is similar to that of a district court’s review.” *In re Rambus, Inc.*, 694 F.3d 42, 46 (Fed. Cir. 2012). Because the expired claims of the patent are not subject to amendment, we apply the principle set forth in *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc) (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)), that “words of a claim ‘are generally given their ordinary and customary meaning,’” as understood by a person of ordinary skill in the art in question at the time of the invention. “In determining the meaning of the disputed claim limitation, we principally look to the intrinsic evidence of record, examining the claim language itself, the written description, and the

prosecution history, if in evidence.” *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 469 F.3d 1005, 1014 (Fed. Cir. 2006) (citing *Phillips*, 415 F.3d at 1312–17).

There are two means-plus-function claim elements relevant to our analysis for the Final Written Decision. “An element in a claim for a combination may be expressed as a means . . . for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.” 35 U.S.C. § 112, ¶ 6.⁴ According to the United States Court of Appeals for the Federal Circuit, “[s]ection 112, ¶ 6 recites a mandatory procedure for interpreting the meaning of a means- or step-plus-function claim element. These claim limitations ‘shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.’” *Al-Site Corp. v. VSI Int’l, Inc.*, 174 F.3d 1308, 1320 (Fed. Cir. 1999) (quoting 35 U.S.C. § 112, ¶ 6); accord *In re Donaldson Co.*, 16 F.3d 1189, 1193–94 (Fed. Cir. 1994) (“[P]aragraph six applies regardless of the context in which the interpretation of means-plus-function language arises, i.e., whether as part of a patentability determination in the PTO or as part of a validity or infringement determination in a court” (footnote or citations omitted)).

We construe such a limitation by first determining the claimed

⁴ Section 4(c) of the Leahy-Smith America Invents Act, Pub. L. No. 112–29, 125 Stat. 284 (2011) (“AIA”) re-designated 35 U.S.C. § 112, ¶ 6, as 35 U.S.C. § 112(f). Because the ’129 patent has a filing date prior to September 16, 2012, the effective date of § 4(c) of the AIA, we refer to the pre-AIA version of 35 U.S.C. § 112.

function and, second, identifying the structure or materials disclosed in the Specification that correspond to the means for performing that function. *See Kemco Sales, Inc. v. Control Papers Co.*, 208 F.3d 1352, 1360 (Fed. Cir. 2000). With respect to the second step, “structure disclosed in the specification is ‘corresponding’ structure only if the specification or prosecution history clearly links or associates that structure to the function recited in the claim.” *Golight, Inc. v. Wal-Mart Stores, Inc.*, 355 F.3d 1327, 1334 (Fed. Cir. 2004) (citations and quotation marks omitted).

1. “[M]eans for prerecording a control track having audio and/or control information corresponding to an audio signal” (claim 22)

The recited function is “prerecording a control track having audio and/or control information corresponding to an audio signal.” The parties dispute the meaning of “and/or” in this term. Petitioner argues that “and/or” means the term encompasses three alternative functions: 1) “prerecording a control track having audio **and** control information corresponding to an audio signal;” 2) “prerecording a control track having audio;” **or** 3) “prerecording a control track having control information corresponding to an audio signal.” Pet. Reply 1–2 (emphasis in original). Petitioner points us to *Ex Parte Gross*, Appeal 2011-004811, slip op. at 4 (PTAB Jan. 1, 2014) in support of its interpretation. *Id.* at 2.

Patent Owner responds that *Gross* does not involve a means-plus-function claim, and “[t]he better way to interpret [the claim] is that . . . the structure has to be capable of creating a control track, or storing a control track that has either audio information, control information corresponding to an audio signal, or both, *so the structure has to be able to do all three.*” Tr. 28:16–18, 29:11–16 (emphasis added). Patent Owner, however, does not point us to any supporting authority. In construing the means-plus-function

limitation of claim 22, we agree with Petitioner that the claimed functions are: (1) prerecording a control track having audio; (2) prerecording a control track having control information corresponding to an audio signal, *or* (3) prerecording a control track having audio *and* control information corresponding to an audio signal.

We next seek to identify the structure disclosed in the Specification that corresponds to the means for performing each function. In its Petition, Petitioner considered the corresponding structure for the “means for prerecording a control track” to be “either a system as shown in FIG. 5, or a device which a human could use to insert control signals into an audio or music signal (not shown).” Pet. 17 (citing Ex. 1020 ¶¶ 30–33). In its Reply, Petitioner indicates that it still agrees that “*one example* of corresponding structure for prerecording a control track having control information and audio requires all of FIG. 5’s components,” but that corresponding structure for (i) prerecording a control track having only audio or (ii) prerecording a control track having only control information corresponding to an audio signal did not extend to all of the components of Fig. 5. Pet. Reply 3 (*italicized emphasis added*).

Petitioner argues that the corresponding structure for the function of prerecording a control track having audio can be as simple as “any form of audio source (e.g., playing unit 170) and a tape recorder.” *Id.* at 4 (citing Ex. 1001, Fig. 5). Petitioner points to the Specification’s disclosure of two-track tape playing unit 170 of Figure 5 as outputting audio signals to four-track tape recorder 180, and the accompanying description of two-track tape playing unit 170 as being able to be replaced by any form of audio source. *Id.* (citing Ex. 1001, 20:25–27; Figs. 5, 6).

While we agree with Petitioner that structure comprising an audio source and a tape recorder likely are capable of performing the function of prerecording a control track having audio, we do not see where the Specification links or associates that structure with that specific function. *See Med. Instr & Diag Corp. v. Elekta AB*, 344 F.3d 1205, 1211 (Fed. Cir. 2003) (“The duty of a patentee to clearly link or associate structure with the claimed function is the quid pro quo for allowing the patentee to express the claim in terms of function under section 112, paragraph 6.”) (citation omitted); *B. Braun Med. Inc. v. Abbott Labs.*, 124 F.3d 1419, 1424–25 (Fed. Cir. 1997) (“Because Braun’s specification does not adequately disclose the valve seat as structure that holds the disc firmly in place, Braun has failed to particularly point out and distinctly claim that particular means.”) (citations omitted).

The Specification appears to make no mention of the function of prerecording a *control track* having only audio and instead appears to distinguish prerecorded *control tracks* from prerecorded *audio*.⁵ *See* Ex. 1001, 4:41–45 (“The system includes means for interfacing between the computer software which controls production of the virtual world, and live or prerecorded music (and/or prerecorded control tracks).”); *id.* at 5:11–20 (“As an alternative (or in addition [to]) extracting signals from music itself . . . [,] one or more prerecorded control tracks corresponding to the music [can be supplied]. For example, control tracks can be prerecorded along with left and right tracks of a stereo music signal. . . . ”); *id.* at 9:61–63 (“Acoustic Etch unit 3” of FIG. 4 can receive digital prerecorded music

⁵ Music is one form of audio contemplated by the ’129 patent. Ex. 1001, Abstr.

and/or control track or analog prerecorded music and/or control track.”); *see also id.* at 15:6–16 (“The audio signals 170L and 170R represent the original audio content of a commercial tape and are not typically processed further. That is to say that the two tracks of four-track tape 180T are the music that the user of the tape would expect to hear without the Acoustic Etch device of the invention. . . . The *other* two tracks that are recorded from signals 141X and 141Y are the *control tracks* that are derived as shown in FIG. 5”) (emphases added).

Because there is nothing in the Specification that clearly links or associates the audio source and tape recorder (or any other structure) with the first identified function of prerecording a *control track* having audio, there is no disclosed corresponding structure for “means for prerecording a control track having audio.” Consequently, we do not adopt Petitioner’s proposed claim construction.⁶

In accordance with *Phillips*, we consider whether the Specification clearly links or associates structure with the second identified function of prerecording a control track having control information corresponding to an audio signal.⁷ Patent Owner argues that the corresponding structure for the

⁶ For similar reasons, there is no disclosed corresponding structure for the third identified function of prerecording a control track having audio and control information corresponding to an audio signal.

⁷ Although Petitioner argued at the oral hearing that the function of prerecording a control track having control information corresponding to an audio signal does not require *creating* a control track, but merely *storing* a control track, such that the corresponding structure for the second function could be as simple as a tape recorder (Tr. 15:9–24, 17:1–4), Petitioner’s briefs do not clearly make this argument. In light of the Specification, we construe the function of prerecording a control track having control information corresponding to an audio signal to mean *both creating and*

means-plus-function claim element includes “a first media player unit [e.g., multitrack tape player 100], one or more input devices [e.g., switches 150, POT 160, data media 165], one or more microprocessors [130X and 130Y], programmed with software to generate a control track from audio data and other input data and connected to the input devices, one or more interface converters [140X, 140Y] connected to the one or more microprocessors, a second media player unit [170], a synchronizer [190] connected to the first and second media player units, and a media recorder [180] connected to the one or more interface converters and the second media player unit.” PO Resp. 10.

In construing means-plus-function limitations in accordance with 35 U.S.C. § 112, ¶ 6, it is improper to “import . . . structural limitations from the written description that are unnecessary to perform the claimed function.” *Wenger Mfg., Inc. v. Coating Mach. Sys., Inc.*, 239 F.3d 1225, 1233 (Fed. Cir. 2001) (citing *Micro Chem., Inc. v. Great Plains Chem. Co.*, 194 F.3d 1250, 1258 (Fed. Cir. 1999)). Patent Owner urges that almost all of the elements disclosed in Figure 5 are necessary for the more limited second function of prerecording a control track having control information corresponding to an audio signal. Tr. 27:2–6.⁸

We disagree. First, we disagree with Patent Owner that interface converters, e.g., tape IF converters 140X, 140Y, are necessary for the more limited second function. See Tr. 28:7. Tape IF converters 140X, 140Y

storing a control track having control information corresponding to an audio signal. See, e.g., Ex. 1001, 5:22–27 (referencing both generation and recording of control tracks).

⁸ Patent Owner conceded that signal conditioners 120A, 120B would be unnecessary in embodiments involving digital audiotapes because signal conditioning is associated only with analog input. Tr. 27:25–28:6.

output a data signal, indicative of the control track generated by the microprocessor, that can be stored on a standard audio magnetic tape, but the Specification indicates that “[t]he recording medium for the inventive prerecorded control tracks does not need to be a four-track audio tape” and “the [CD] and Digital Audio Tape (DAT) formats already offer control track capabilities.” Ex. 1001, 20:10–14. Second, we disagree with Patent Owner that a second media player unit, e.g., element 170, and synchronizer, e.g., element 190, are necessary for the more limited second function. These particular structures relate to the audio component, as opposed to the control track component. Ex. 1001, 13:50–59, Fig. 5.

We determine that the structure identified in the Specification as necessary to perform the second function (i.e., prerecording a control track having control information corresponding to an audio signal) includes: (i) a first media player unit, a microprocessor for generating a control track from the received data from the media player unit, and a media recorder (*id.* at 13:11–31, 20:10–13); or (ii) one or more input devices for inputting signals, a microprocessor for generating a control track from the received signals, and a media recorder (*id.* at 13:32–48, 20:10–13). This corresponding structure, and equivalents thereof, is the proper construction of the means for prerecording a control track having audio and/or control information corresponding to an audio signal, and we therefore adopt it for purposes of this Decision.

2. *Means for supplying the audio signal to the processor (claim 23)*

Patent Owner argues that the corresponding structure in the Specification for the claimed “means for supplying the audio signal to the processor” comprises “an analyzer [5] connected to an audio source [1] and

an interface [6] connected to the analyzer [5] and to a processor [7].”

PO Resp. 15–17 (citing Ex. 1001, 8:38–40, 43–45, 9:4–6, Fig. 2; Ex. 2006 ¶ 19). Petitioner counters that Patent Owner is attempting to incorporate unnecessary structure, including the analyzer and interface, when neither is required by the claims. Pet. Reply 5. Petitioner points to its expert’s opinion that “multiple elements . . . could be the ‘means for supplying the audio signal to the processor’ including ‘music source’ that goes directly into the VR processor and ‘skip[s] the A/D, analyzer, interface box.’” *Id.* at 6 (citing Ex. 1020, 38:13–17); *see also* Ex. 1001, 8:45–47 (“One or more of the control tracks (or . . . the music signal alone) can be supplied directly to VR processor 7.”).

Petitioner argues that Figure 6 of the ’129 patent shows that audio signals 200R and 200L are supplied to virtual reality system 250 by four-track tape 180T and four-track tape playing unit 200 via multichannel audio digitizer 245, which converts the analog music signals leaving playing unit 200 (or live microphone 248) into digital signals. Pet. Reply 5 (citation omitted). Petitioner also argues that the Specification discloses that CD and DAT formats may be used in place of four-track audio tape. *Id.* (citation omitted). Petitioner argues, therefore, that the disclosed structure in the Specification for supplying the audio signal to the processor includes (1) a four-track tape 180T and four-track tape playing unit, or live microphone, and a multichannel audio digitizer (for converting audio signals to digital), or (2) a CD or DAT recording medium. *Id.* (citation omitted); *see Micro Chem., Inc.*, 194 F.3d at 1258 (“Identification of corresponding structure may embrace more than the preferred embodiment. A means-plus-function claim encompasses all structure in the specification corresponding to that

element and equivalent structures.”).

We disagree with Patent Owner that the analyzer and interface of Figure 2 are necessary to perform the claimed function of supplying the audio signal to the processor in light of the Specification’s disclosure of an alternate embodiment in which the music signal goes directly to the processor. *See* Ex. 1001, 8:45–47. We agree with Petitioner and determine that the structure disclosed in the Specification necessary to perform the claimed function of supplying the audio signal to the processor includes: (i) four-track tape and four-track tape playing unit and a multichannel audio digitizer, (ii) a live microphone and a multichannel audio digitizer, or (iii) a CD or DAT recording medium. This corresponding structure, and equivalents thereof, is the proper construction of the means for supplying the audio signal to the processor, and we therefore adopt it for purposes of this Decision.

B. Anticipation of Claim 10 by Pocock-Williams

1. Overview of Pocock-Williams

Pocock-Williams describes the creation of “a computer system . . . that uses rule-system technology to assist in the automatic translation of sound to image,” i.e., the automatic generation of computer animation that correlates to the emotional characteristics of music. Ex. 1007, 5. According to Pocock-Williams, “[s]ound-to-image integration consists of five major steps.” *Id.* at 6. The first step is “music-data input” using software such as SoundScape Pro MIDI Studio. *Id.* at 6–7. The second step is “music-data analysis according to predefined strategy.” *Id.* at 6. Input music data is written to a character file, converted to an integer format, and written to a music data file. *Id.* at 7. Pitch and duration can be the “main elements of

analysis” to capture the emotional characteristics of the music. *Id.* at 5. An exemplary strategy for analysis is a determination of a simplified pitch-time graph for a 10 second music phrase of the music data file, a search for higher order patterns in the graph, and a determination of the “predominant higher order pattern.” *Id.* at 7.

Pocock-Williams’s third step is “decision-making according to a predefined set of rules.” *Id.* at 6. A computer language program called “Analyzer” “randomly selects an animation phrase from several animation phrases that have been preclassified as being visual expressions of music containing the predominant higher order pattern.” *Id.* at 7. The fourth step is “animation generation.” *Id.* at 6. In this step, a subroutine call to a 10 second animation phrase that corresponds to the 10 second music phrase is written to a file called “GenAni.” *Id.* at 7–8. Steps 2 through 4 are repeated until all of the music has been analyzed. *Id.* at 8. The fifth step is “transfer to videotape,” in which “the visuals and music are combined with camera imagery and then transferred to videotape.” *Id.* at 6, 8. “[T]he entire generated-animated work is a collection of sub-routine calls written into a GenAni file, and the resulting video is a synchronization of animation and music terminals.” *Id.* at 8.

2. Analysis

Petitioner alleges that claim 10 of the ’129 patent is anticipated by Pocock-Williams. Pet. 19–21. With respect to the claimed step of “prerecording a control track having audio and/or control information corresponding to an audio signal,” Petitioner argues that the “GenAni file” is a control track and that it has audio and/or control information corresponding to an audio signal because of the subroutine call statements

written into the GenAni file. *Id.* at 20 (citing Ex. 1020 ¶¶ 37–59). With respect to “prerecording” in particular, Petitioner argues that Pocock-Williams discloses “that the computer animations may be ‘prerecorded,’ that is, created in advance using computer programs.” *Id.* at 19 (citing Ex. 1020 ¶¶ 45–52); *see* Ex. 1020 ¶ 50 (“One with skill in the art . . . would understand that the GenAni file of *Pocock-Williams* could be saved in the memory or the data storage of a computer system and later executed. Accordingly, one with skill in the art would consider the GenAni file a prerecorded control track.”). With respect to the claimed step of “operating the computer system in response to said prerecorded control track,” Petitioner argues that Pocock-Williams discloses that “the GenAni file was executed, and the resulting generated animation was realized” after completion of the analysis for each music terminal. Pet. 19, 21 (citing Ex. 1007, 9; Ex. 1020 ¶¶ 45–54). Patent Owner does not dispute any of Petitioner’s assertions with respect to claim 10.

Upon review of the Petition and supporting evidence, as well as the Patent Owner Response and supporting evidence, we conclude that Petitioner has demonstrated, by a preponderance of the evidence, that Pocock-Williams anticipates claim 10 of the ’129 patent.

C. Anticipation of Claim 11 by Pocock-Williams

Petitioner alleges that claim 11 of the ’129 patent, reciting the steps of “supplying the audio signal to the computer system” and “operating the computer system in response to *both* the audio signal and the prerecorded control track,” is anticipated by Pocock-Williams. Pet. 21; Ex. 1001, 29:63-64 (emphasis added). Petitioner argues that the audio signal is supplied to the computer system in Pocock-Williams during the music data

input step. Pet. 21 (citing Ex. 1007, 7) (“Music-data input software allows music to be entered into a computer. SoundScape Pro MIDI Studio, the primary software used for music-data input, allows a musician to enter music into the computer, play the music through the computer’s speakers and ‘save’ the music in standard format.”).

Petitioner further argues that the computer system of Pocock-Williams operates in response to the audio signal because “the resulting video is a synchronization of animation and music terminals” and “each piece [animations] is accompanied by its corresponding music.” Pet. 21 (quoting Ex. 1007, 6, 8); *see also* Ex. 1020 ¶ 57 (“[T]he computer system of *Pocock-Williams* is operated in response to both the GenAni file, which generates the visuals, and the music, which the computer system ‘combines’ with the visuals and camera imagery before transferring to the videotape.”). Patent Owner counters by arguing that Pocock-Williams only discloses that an animation is generated from a control track—i.e., the GenAni file—not that an animation is created from both an audio signal and a control track. PO Resp. 33–34. Patent Owner’s argument is not commensurate with the scope of the claim, which merely requires that the computer system be operated in response to the audio signal, not particularly that the animation file be created from the audio signal. *See* Dec. Inst. 11 (citing Ex. 1001, 29:63–64; 30:64–65).

Patent Owner also argues that the claimed step of “operating the computer system in response to both the audio signal and the prerecorded control track” must occur *after* the prerecorded control track exists, whereas the music data input step, purportedly relied on by the Board in its Decision on Institution, takes place *before* the prerecorded control track even exists.

PO Resp. 34–35 (citing Dec. Inst. 11). The Board, however, relies on the final integration step, rather than the music data input step, as corresponding to the claimed step of operating the computer system in response to both the audio signal and the prerecorded control track, and the final integration step must occur after the prerecorded control track exists. *See* Dec. Inst. 11; *see also* Pet. Reply 9–10 (footnote omitted) (“*Pocock-Williams* discloses ‘operating the computer system in response to both the audio signal and the prerecorded track’ because it discloses a computer system (an Amiga computer) being operated in response to a control track (‘GeniAni’ file) and a computer system being operated in response to an audio signal—short sections of animation (‘animation terminals’) are matched up with the corresponding short section of music (‘music terminal’), to produce the animation and integrated to produce a final video tape.”) (citing Ex. 1007, 8–9, Fig. 7). Consequently, we are not persuaded by Patent Owner’s argument.

Upon review of the Petition and supporting evidence, as well as the Patent Owner Response and supporting evidence, we conclude that Petitioner has demonstrated, by a preponderance of the evidence, that *Pocock-Williams* anticipates claim 11 of the ’129 patent.

D. Anticipation of Claim 22 by Pocock-Williams

Petitioner alleges that claim 22 of the ’129 patent is anticipated by *Pocock-Williams*. Pet. 21–23; Pet. Reply 7–8. In its Petition, Petitioner argues that the means for prerecording a control track is disclosed in *Pocock-Williams* by the “Analyzer,” which is a C computer-language program that “reads a 10-sec music phrase from the Music File, determines a ‘simplified pitch-time graph’ for the phrase and then searches for higher

order patterns in the graph.” Pet. 22 (quoting Ex. 1007, 7, Figs. 5, 6).
Petitioner asserts that Analyzer chooses an animation phrase. *Id.*; see Ex. 1007, 7 (“Dependent upon the predominant higher order pattern of the simplified pitch-time graph, decisions are made by the program regarding the visuals that best suit the music with the given graph characteristics.”).
Petitioner further asserts that a “subroutine call to a 10-sec animation phrase that corresponds to the 10-sec music phrase is written to a file called GenAni.” *Id.* (quoting Ex. 1007, 7, Figs. 5, 6).

In its Reply, Petitioner argues that the means for prerecording a control track is disclosed in Pocock-Williams by its teaching that music is entered into a computer running “SoundScape Pro MIDI Studio” because “[o]nce entered, the music may be saved and played back through the computer’s speakers, or analyzed by a second program called ‘Extractor.’” Pet. Reply 8 (citing Ex. 1007, 7).

We construed claim 22 to be limited to the structures described in the Specification, and equivalents thereof, for prerecording a control track having control information corresponding to an audio signal. *See supra* Section II.A.1. Petitioner does not explain adequately how Pocock-Williams discloses either of the sets of structures described in Patent Owner’s Specification, i.e., (i) a first media player unit, a microprocessor generating a control track from the received data from the media player unit, and a media recorder, or (ii) one or more input devices for inputting signals, a microprocessor for generating a control track from the received signals, and a media recorder. Petitioner also does not explain adequately how Pocock-Williams’s disclosed structure of the “Analyzer” computer program and/or a computer with SoundScape Pro MIDI Studio is equivalent to either of these

structures described in Patent Owner's Specification.⁹

Upon review of the Petition and supporting evidence, as well as the Patent Owner Response and supporting evidence, we conclude that Petitioner has not demonstrated, by a preponderance of the evidence, that Pocock-Williams anticipates claim 22 of the '129 patent.

E. Anticipation of Claim 23 by Pocock-Williams

Claim 23 depends from claim 22. Petitioner's challenge to claim 23 relies on the same arguments and reasoning that we found deficient in the challenge of claim 22. Pet. 22–23; Pet. Reply 7–11. Accordingly, for the same reasons provided above, we conclude that Petitioner has not demonstrated, by a preponderance of the evidence, that Pocock-Williams anticipates claim 23 of the '129 patent.

F. Anticipation of Claim 10 by Fallacaro

1. Overview of Fallacaro

Fallacaro describes systems for enhancing a viewer's observation of a presentation, such as a concert. Ex. 1005, 1:39–42. In particular, Fallacaro describes “tactile stimulation or, alternatively, audible and/or visual stimulation in addition to that present in the audio and/or visual presentation” in response to specific occurrences during the presentation, such as “specific frequencies occurring during a concert.” *Id.* at 2:38–45, 3:33–34. Audio-frequency control tones may be “generated automatically

⁹ The proper test for determining equivalent structure under § 112, ¶ 6 is whether the differences between the structure in the asserted reference and the structure in the properly construed claim are insubstantial. *See Valmont Indus., Inc. v. Reinke Mfg. Co.*, 983 F.2d 1039, 1043 (Fed. Cir. 1993) (“In the context of section 112, however, an equivalent results from an insubstantial change which adds nothing of significance to the structure, material, or acts disclosed in the patent specification.”).

by appropriate electronic circuitry responsive to the sounds generated at the concert” with a specific control tone generated in response to each specific frequency. *Id.* at 20:43–48. The resulting stimulation in the concert example may be “impacting some portion of the listener’s body each time the specific frequencies occur.” *Id.* at 3:34–36.

2. Analysis

Petitioner alleges that claim 10 of the ’129 patent is anticipated by Fallacaro. Pet. 24–27, 33–34. With respect to the claimed step of “prerecording a control track having audio and/or control information corresponding to an audio signal,” Petitioner argues that Fallacaro discloses that encoded data corresponding to specific frequencies in the music can be “recorded in a medium,” such as on “a videocassette or cartridge, or an audio cassette, record or compact disc.” Pet. 33 (quoting Ex. 1005, 2:64–67); Ex. 1020 ¶ 109. With respect to the second claimed step of “operating the computer system in response to said prerecorded control track,” Petitioner argues that Fallacaro discloses tactile stimulation via bands worn around the viewers’ chests or stomachs in response to control tones. Pet. 34 (citing Ex. 1005, 20:54-21:2); *see also* Ex. 1020 ¶ 111 (“[T]he audio and control tones are encoded into the same medium (such as a videocassette, or audio cassette, record or compact disc).”). Patent Owner does not dispute any of Petitioner’s assertions with respect to claim 10.

Upon review of the Petition and supporting evidence, as well as the Patent Owner Response and supporting evidence, we conclude that Petitioner has demonstrated, by a preponderance of the evidence, that Fallacaro anticipates claim 10 of the ’129 patent.

G. *Anticipation of Claim 11 by Fallacaro*

Petitioner alleges that claim 11 of the '129 patent is anticipated by Fallacaro. Pet. 34-35. Petitioner argues that Fallacaro discloses “supplying the audio signal to the computer system, so that the audio may be ‘enhanced’ with the stimulation.” Pet. 34 (citing Ex. 1020 ¶ 103, Appendix C; Ex. 1005, Abstr.). Petitioner further argues that Fallacaro discloses operation of the computer system in response to both the audio signal and prerecorded track at least because

[t]he output of the band pass filter 50 comprising the control tones and the program audio minus any frequencies exceeding 4 kHz are combined by the mixer circuit 52 comprising the operational amplifier U15. The output from the mixer 52 is then broadcast in a conventional manner along with the program video.

Pet. 35-36 (citing Ex. 1005, 12:17-33; 8:30-35).

Patent Owner argues that Fallacaro’s computer system “operates in response to *either* an audiovisual signal or a prerecorded videocassette, not in response to *both* an audio signal and a prerecorded control track.” PO Resp. 27 (emphases added) (footnote or citations omitted). Patent Owner’s argument relates specifically to one example provided by Petitioner in its Petition.¹⁰ Patent Owner’s argument is not persuasive because it does not address other examples provided by Petitioner in support of its anticipation challenge in which operation of Fallacaro’s computer system is argued to be

¹⁰ Patent Owner quotes the Petitioner’s reproduction of a portion of Fallacaro on pages 35 and 36 of the Petition in which “the incoming audiovisual signal is initially received, in the usual fashion, by an antenna or over a cable television line. Alternatively, if the audiovisual signal with encoded control tones has been recorded on a videocassette, the videocassette or a copy thereof may be utilized with the system of the present invention.” Prelim. Resp. 27 (quoting Pet. 35, 36).

in response to both an audiovisual signal and a prerecorded control track. *See, e.g.*, Pet. 36 (citing Ex. 1005, 9:44-52 (“As diagrammatically illustrated in FIG. 5, the decoder/transmitter section 22 of the present invention comprises a videocassette recorder 64 with separate outputs for the audio and video components of the audiovisual signal. The audio component is applied to a high pass filter 66 which filters out the usual program audio and passes the control tones, and a low pass filter 68 which separates out the control tones and passes the program audio.”)).

Upon review of the Petition and supporting evidence, as well as the Patent Owner Response and supporting evidence, we conclude that Petitioner has demonstrated, by a preponderance of the evidence, that Fallacaro anticipates claim 11 of the ’129 patent.

H. Anticipation of Claim 22 by Fallacaro

Petitioner alleges that claim 22 of the ’129 patent is anticipated by Fallacaro. Pet. 42–43. In its Petition and its Reply, Petitioner argues that the means for prerecording a control track is disclosed in Fallacaro by “means for generating data representing one or more events occurring during an audio and/or visual presentation” and “means for encoding the data . . . in a form suitable for transmission” that can be “recorded in a medium”, for example “on a videocassette or cartridge, or an audio cassette, record or compact disc.” *Id.* (citing Ex. 1005, 2:46–50, 64–67); Pet. Reply 13.

Petitioner has explained adequately how Fallacaro discloses a first media player unit (e.g., a unit for playing an audio and/or visual presentation, such as “audiovisual presentations of the type displayed on a video monitor”) (Pet. 42 (citing Ex. 1005, 2:37–45, 21:36–39)), a microprocessor for generating a control track (e.g., means for encoding the

data representing one or more events occurring during the audio and/or visual presentation in a signal suitable for transmission) (*id.* (citing Ex. 1005, 2:46–50)),¹¹ and a media recorder (e.g., the encoded data can be recorded in a medium, such as a videocassette or cartridge, audio cassette, record, or compact disc) (*id.* at 42–43 (citing Ex. 1005, 2:64–67)).

Patent Owner’s argument that “the corresponding structure of this means plus function claim limitation contains many more components than those mentioned by Petitioner,” such as first and second media player units, a synchronizer connected to both units, and interface devices (PO Resp. 25) is not persuasive in light of the construction assigned to the means-plus-function limitation of independent claim 22 in which a second media player unit, synchronizer, and interface device were deemed unnecessary to perform the claimed function. *See supra* Section II.A.1.

With respect to the specific limitation of claim 22 relating to “a processor which receives the control track and which is programmed with software for operating the computer system in response to said control track,” Petitioner argues that Fallacaro inherently discloses this limitation in alternate embodiments. Pet. 27, 43 (citing Ex. 1005, Figs. 5–10, 20:54–21:2, 21:19–39; Ex. 1020 ¶ 114 (“One of ordinary skill in the art would recognize that, in a video game system, instructions from a video cartridge are interpreted by a processor in the video game system (a computer system)

¹¹ *See also* Pet. 43 (citing Ex. 1005, 20:41–55) (“it is contemplated that the control tones will be generated automatically by appropriate electronic circuitry responsive to the sounds generated at the concert. . . . As circuitry for distinguishing between specific audio frequencies and for driving the encoder 20 for generating control tones indicative of such specific frequencies is well known in the art, a further description thereof is not deemed necessary.”).

to control the graphic display, and that those instructions would be software instructions.”)). On the record before us, we credit the testimony of Dr. Zyda that Fallacaro inherently discloses a processor.

Upon review of the Petition and supporting evidence, as well as the Patent Owner Response and supporting evidence, we conclude that Petitioner has demonstrated, by a preponderance of the evidence, that Fallacaro anticipates claim 22 of the ’129 patent.

I. Anticipation of Claim 23 by Fallacaro

Petitioner alleges that claim 23 of the ’129 patent is anticipated by Fallacaro. Pet. 43–44. Petitioner argues that Fallacaro discloses the claimed “means for supplying the audio signal to the processor” in that “if the audiovisual signal with encoded control tones has been recorded on a videocassette, the videocassette or a copy thereof may be utilized with the system of the present invention.” *Id.* (citing Ex. 1005, 9:40–44, 21:7–9, 21:60–61); *see also* Pet. Reply 15 (citing Ex. 1005, 2:63–67) (“[T]he encoded data can be recorded in a medium along with the audio and/or visual presentation. For example, the medium may comprise a videocassette or cartridge, or an audio cassette, record or compact disc.”).

Petitioner has explained adequately how Fallacaro discloses the structure of the Specification necessary to perform the claimed function of supplying the audio signal to the processor, namely, a compact disk recording medium. Pet. Reply 15 (citing Ex. 1005, 2:65–67). Patent Owner’s argument that “Petitioner failed to identify any such analyzer, interface or connection in Fallacaro” (PO Resp. 29) (footnote or citation omitted) is not persuasive in light of the construction assigned to the means-plus-function limitation of dependent claim 23 in which such additional

structure was deemed unnecessary to perform the claimed function. *See supra* Section II.A.2.

With respect to the second part of the claim in which “the processor is programmed with software for operating the computer system in response to both the audio signal and the control track,” Petitioner argues that Fallacaro discloses hardware operating the computer system in response to both the audio signal and the control track, but that in alternate embodiments, “the operating would be accomplished using a processor and software.” Pet. 44 (citing Ex. 1001, 21:35–39, Figs. 5–10; Ex. 1020 ¶ 114). On the record before us, we credit the testimony of Dr. Zyda that Fallacaro inherently discloses a processor.

Patent Owner’s argument that Fallacaro’s computer system “operates in response to *either* an audiovisual signal or a prerecorded videocassette, not in response to *both* an audio signal and a prerecorded control track” (PO Resp. 27 (citing Ex. 2006 ¶¶ 23-24) (emphasis added)) is not persuasive for the same reasons set forth in connection with the challenge to dependent claim 11.

Upon review of the Petition and supporting evidence, as well as the Patent Owner Response and supporting evidence, we conclude that Petitioner has demonstrated, by a preponderance of the evidence, that Fallacaro anticipates claim 23 of the ’129 patent.

III. CONCLUSION

We determine Petitioner has established by a preponderance of the evidence that, under 35 U.S.C. § 102(b): claims 10 and 11 are unpatentable as anticipated by Pocock-Williams; and claims 10, 11, 22, and 23 are unpatentable as anticipated by Fallacaro.

IV. ORDER

In consideration of the foregoing, it is:

ORDERED that claims 10, 11, 22, and 23 of the '129 patent have been shown by a preponderance of the evidence to be unpatentable.

This is a Final Written Decision. Parties to this proceeding seeking judicial review of our decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

IPR2014-00155
Patent 5,513,129

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