

**IN THE UNITED STATES DISTRICT COURT  
FOR THE DISTRICT OF DELAWARE**

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PRINCETON DIGITAL IMAGE  
CORPORATION,

Plaintiff,

v.

KONAMI DIGITAL ENTERTAINMENT INC.,  
HARMONIX MUSIC SYSTEMS, INC., and  
ELECTRONIC ARTS, INC.

Defendants.

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C.A. No. 12-1461-LPS-CJB

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PRINCETON DIGITAL IMAGE  
CORPORATION,

Plaintiff,

v.

UBISOFT ENTERTAINMENT SA and  
UBISOFT INC.,

Defendants.

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C.A. No. 13-335-LPS-CJB

**MEMORANDUM ORDER**

WHEREAS, Magistrate Judge Burke issued a Report and Recommendation (D.I. 183)<sup>1</sup> on December 2, 2016, recommending that the Court adopt certain claim constructions for disputed terms in U.S. Patent No. 5,513,129 (the “129 patent”);

WHEREAS, on December 23, 2016, Defendants Konami Digital Entertainment Inc. (“Konami”), Harmonix Music Systems, Inc. (“Harmonix”), Electronic Arts, Inc. (“EA”), Ubisoft Entertainment SA, and Ubisoft, Inc. (together with Ubisoft Entertainment SA, “Ubisoft” and,

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<sup>1</sup>All references to the Docket Index are to C.A. No. 12-1461, unless otherwise noted.

collectively, “Defendants”) objected to the Report (D.I. 185), specifically objecting to the recommended constructions of “virtual reality computer system” and “virtual environment;”

WHEREAS, on January 6, 2017, Princeton Digital Image Corporation (“PDIC”) responded to the objections (D.I. 186);

WHEREAS, Magistrate Judge Burke issued a second Report and Recommendation (D.I. 193) on June 16, 2017, recommending claim constructions for additional disputed terms in the ’129 patent, primarily its means-plus-function terms;

WHEREAS, on June 30, 2017, PDIC also objected to the second Report (D.I. 196), specifically objecting to the recommended constructions of the “means for supplying a first signal,” “means for prerecording,” and “control track is time shifted relative to the music signal” terms;

WHEREAS, on June 30, 2017, Defendants also objected to the second Report (D.I. 195); specifically objecting to the recommended construction of the “means for prerecording” term;

WHEREAS, on July 14, 2017, Defendants responded to PDIC’s objections (D.I. 197) and PDIC responded to Defendants’ objections (D.I. 198);

WHEREAS, the Court has considered the parties’ claim construction disputes addressed in the Report *de novo*, see *St. Clair Intellectual Prop. Consultants, Inc. v. Matsushita Elec. Indus. Co., Ltd.*, 691 F. Supp. 2d 538, 541-42 (D. Del. 2010); 28 U.S.C. § 636(b)(1); Fed. R. Civ. P. 72(b)(3);

NOW THEREFORE, IT IS HEREBY ORDERED that:

1. Defendants’ objections (D.I. 185) to Judge Burke’s recommended constructions of “virtual reality computer system” and “virtual environment” are OVERRULED and the

constructions set forth in Judge Burke's Report (D.I. 183) are ADOPTED.

2. PDIC's objections (D.I. 196) to Judge Burke's recommended construction of the "means for supplying a first signal" term are SUSTAINED IN PART and OVERRULED IN PART. The construction set forth in Judge Burke's Report is MODIFIED only with respect to the structure corresponding to Function 2, which the Court will construe as that recited at col. 12 l. 63 - col. 13 l. 10; col. 13 l. 60 - col. 14 l. 22; col. 16 l. 43 - col. 17 l. 12; col. 20 ll. 10-34; and Figures 1, 2, 4, and 6.

3. With respect to the "means for prerecording" term, Defendants' objections (D.I. 195) to Judge Burke's recommended construction are OVERRULED, while PDIC's objections (D.I. 196) to Judge Burke's recommended construction are SUSTAINED IN PART and OVERRULED IN PART. The construction set forth in Judge Burke's Report is MODIFIED only with respect to the structure corresponding to Functions [a] and [c], which the Court will construe as that recited at col. 7 ll. 30-32; col. 8 l. 58 - col. 9 l. 3; col. 12 ll. 38-42, 57-62; col. 13 ll. 21-31, 41-59; col. 14 l. 55 - col. 15 l. 16; col. 20 ll. 10-20; and Figures 2 and 5.

4. PDIC's objections (D.I. 196) to Judge Burke's recommended construction of "control track is time shifted relative to the music signal" are OVERRULED and the construction set forth in Judge Burke's Report (D.I. 193) is ADOPTED.

*"virtual reality computer system"* (claims 14, 19, 20)

Konami, but not the other Defendants, objects to the Report's construction of "virtual reality computer system" as meaning "a computer system programmed with software, and including peripheral devices, for producing a virtual environment," a construction that does not exclude video game systems. (D.I. 185 at 9-10) Konami contends that this construction cannot

be correct because the patentee disavowed video game systems and the patent makes clear that the two systems are mutually exclusive. The Court disagrees. It is true that in the background of the invention, the patent compares and contrasts conventional virtual reality systems and video game systems, describing disadvantages of both. *See* '129 patent col. 1 ll. 58-67. But this discussion, which suggests that the prior art systems were different from each other, does not rise to the exacting standard required for disavowal. *See, e.g., Retractable Techs., Inc. v. Becton, Dickinson & Co.*, 653 F.3d 1296, 1306 (Fed. Cir. 2011) (“In general, statements about the difficulties and failures in the prior art, without more, do not act to disclaim claim scope.”). Indeed, the purpose of the present invention was to “overcome[] the limitations of conventional VR systems.” Col. 2 ll. 18-19. Moreover, the patent indicates that the claimed invention may incorporate certain components of video game systems, such as cartridges. *See* col. 8 ll. 62-65; col. 11 ll. 65-67 (“One can imagine the integration of an Acoustic Etch unit into a cartridge for a video game machine with CD capability, for example.”). Therefore, the Court finds no clear or unambiguous disclaimer of scope.

*“virtual environment”* (claims 14, 19, 20)

Defendants object to the Report’s recommended construction and conclusion that this term is not indefinite. (D.I. 185 at 3) There is no dispute that the specification defines “virtual environment” as “a computer-simulated environment (intended to be immersive) which includes a graphic display (from a user’s first person perspective, in a form intended to be immersive to the user), and optionally also sounds which simulate environmental sounds.” Col. 1 ll. 22-28. But in applying this definition, the parties dispute what it means to be “intended to be immersive.”

Defendants first object to the Report's recommended construction of "immersive" as "an environment with depth that enables the user to interact with the scene being displayed, typically by simulating motion or manipulating virtual objects in the virtual environment." (D.I. 183 at 42) Defendants contend that this construction incorrectly focuses on depth, interactivity, and first-person perspective and excludes preferred embodiments of the '129 patent. The Court disagrees. As the Report found (D.I. 183 at 27-29), the specification demonstrates that immersion "enable[s] a user to interact with the scene being displayed," col. 1 ll. 37-38, and is "from a user's first person perspective," col. 1 ll. 25-26. Moreover, the patent's immersive and non-immersive examples demonstrate that immersion includes a sense of depth. (See D.I. 183 at 30-32) The Court agrees with the Report as to what the patent means to be "immersive." Further, the recommended construction does not exclude embodiments described in the patent. These embodiments – virtual dancers that dance in time to music, col. 4 l. 60 - col. 5 l. 10; "virtual hands clapping in time to the beat of the music," col. 11 ll. 38-39; and "virtual cylinders" with heights that change in response to, e.g., the bass drum or snare drum, col. 18 ll. 15-37 – are examples of how to make an immersive environment in which virtual objects are manipulated in response to the music, such that "the user is viewing a scene that includes virtual objects with depth from a first-person perspective, which in turn can allow the user to interact with the scene and feel as if she is a part of it." (D.I. 183 at 32)

Defendants also contend that the term is indefinite. (D.I. 185 at 8-9) The parties agree that a head-mounted display is the upper boundary of immersiveness. (See D.I. 185 at 3) Defendants contend that, despite this upper boundary, the concept of immersion is subjective, with no "objectively define[d] boundary between 'an immersive' computer-simulated

environment and one that is not.” (D.I. 185 at 9) Defendants submit that they have carried their burden to prove indefiniteness by clear and convincing evidence, as they submitted expert testimony and PDIC did not. The Court disagrees. Defendants’ expert evidence is not dispositive. Instead, the specification itself provides sufficient detail about what it means to be “immersive,” as described above. Defendants have failed to prove indefiniteness.

*“means for supplying a first signal selected from a group consisting of a control signal having music and/or control information generated in response to a music signal, a prerecorded control track having music and/or control information corresponding to the music signal, and a control signal having music and/or control information generated in response to the prerecorded control track” (claim 14)*

With respect to this claim term, PDIC first objects to the function identified by the Report: “supplying a first signal selected from a group consisting of [1] a control signal having music and/or control information generated in response to a music signal, [2] a prerecorded control track having music and/or control information corresponding to the music signal, [3] and a control signal having music and/or control information generated in response to the prerecorded control track function.” (D.I. 196 at 1-2) The Report concluded that PDIC is precluded from rearguing the function of this term due to positions it took during *inter partes* review (“IPR”) of the ’129 patent. In the IPR, with respect to independent claim 12 (the source of this claim limitation, as claim 14 depends from claim 12), PDIC advocated for – and persuaded the Patent Trial and Appeal Board (“PTAB”) to adopt (*see* D.I. 118 Ex. 4 at 396) – the function recommended by the Report. (*See* D.I. 182 at 137) PDIC contends that issue preclusion should not apply because claim 14 was not the subject of the IPR proceedings, and the Court separately concluded that Defendants are not estopped under 35 U.S.C. § 315(e)(2) from challenging the validity of claim 14. (*See* D.I. 191 at 4-5) Issue preclusion is not the same as the statutory

estoppel provision. With issue preclusion, “[i]t is the issues litigated, not the specific claims around which the issues were framed, that is determinative.” *Aspex Eyewear, Inc. v. Zenni Optical Inc.*, 713 F.3d 1377, 1382 (Fed. Cir. 2013). Here, the issue of the function of the “means for supplying” term, which appears in claim 12 and is incorporated into dependent claim 14, was fully and fairly litigated by PDIC.<sup>2</sup> *See Senju Pharm. Co. v. Lupin Ltd.*, 2012 WL 6090354, at \*2 (D. Del. Dec. 7, 2012). Therefore, the Court agrees with the Report’s construction of the function of this claim term.

PDIC next objects to the Report’s recommendation of structures corresponding to Function 1: “supplying . . . a control signal having music and/or control information generated in response to a music signal.” (D.I. 196 at 2-4) The Report breaks this into two functions: [1a] a control signal having music (structure at col. 5 ll. 1-10; col 11 ll. 31-37), and [1b] a control signal having control information (structure at col. 10 l. 66 - col. 11 l. 1; col. 11 ll. 17-43).<sup>3</sup> (*See* D.I. 193 at 38) PDIC contends that the passages at col. 5 ll. 1-10 and col 11 ll. 31-37 should be assigned to Function [1b], as they correspond to control signals having **control information**, not music, and that other passages correspond to control signals having **music**. PDIC suggests that

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<sup>2</sup>Moreover, because the patent expired before the IPRs were instituted, the PTAB applied the *Phillips* standard for claim construction. (*See* D.I. 118 Ex. 4 at 392; *see also Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005)) Hence, there is no argument that the application of a different standard (i.e., broadest reasonable interpretation) means the present dispute was not actually litigated.

<sup>3</sup>Defendants presented these constructions as undisputed in their claim construction briefing to Judge Burke. (*See* D.I. 163 at 5-6) (“PDIC does not disagree with Defendants’ proposed structures for . . . 1(a): a control signal having music . . . generated in response to a control signal;” “Defendants agree to construe the structure for Function 1(b) as 10:66-11:1 and 11:17-43.”) However, it appears from PDIC’s claim construction briefing and oral argument that there was not agreement on these structures. (*See* D.I. 147 at 5-6 & n.16; D.I. 182 at 133-34) Accordingly, the Court will address the merits of this objection.

the structure corresponding to Function [1a] is an analog-to-digital conversion circuit. The Court disagrees. The patent does not describe a music signal that has merely been converted as a control signal. It is not until the music signal has been *processed* that a control signal is generated. *See, e.g.*, col. 8 ll. 33-52; col. 9 l. 25 (“control signals [are] generated from the analyzed music”). Thus, “a control signal having music” must be something more than a music signal converted from analog to digital format. The passages identified by the Report describe music-processing steps that generate control signals. *See* col. 5 ll. 1-10 (describing “a simple algorithm . . . to extract a rhythm signal indicative of the beat of some frequency band of the music (e.g. a band representing drums), or of some other parameter of a frequency band of the music”); col. 11 ll. 31-37 (describing how to “analyze the music in terms of its spectral components . . . [to] make a determination as to the rhythm or beat of the music”). The Court is persuaded that these passages describe the structure that corresponds to Function [1a] of “supplying . . . a control signal having music . . . generated in response to a music signal.” It follows that the Court is also not persuaded to modify the Report’s structure corresponding to Function [1b] of “supplying . . . a control signal having . . . control information generated in response to a music signal.”

PDIC also objects to the structure recommended by the Report – col. 12 l. 63 - col. 13 l. 10; col. 13 l. 60 - col. 14 l. 22; col. 16 l. 43 - col. 17 l. 12 – as corresponding to Function [2] (“supplying . . . a prerecorded control track having music and/or control information corresponding to the music signal”). (D.I. 196 at 4-5) PDIC contends that this structure is correct but incomplete, pointing to col. 20 ll. 10-34 and Figures 1, 2, 4, and 6 as additional structure for performing this function. PDIC seeks to make the structure for Function [2] the



same as that recommended for Function [3]. Defendants respond that PDIC did not previously make this argument. The Court disagrees. Although Defendants presented this issue as undisputed to Judge Burke (*see* D.I. 163 at 5-6), and PDIC did not press its position with any force, PDIC did, in fact, contend that the structure for Functions [2] and [3] should be the same. (*See* D.I. 147; D.I. 182 at 135-36) The Report acknowledged the overlap between these elements, as “the same basic corresponding structure” supports both functions. (D.I. 193 at 16 n.11) Given the substantial overlap, the Court agrees with PDIC that the structure corresponding to Function [2] should be the same as that for Function [3], as recited at col. 12 l. 63 - col. 13 l. 10; col. 13 l. 60 - col. 14 l. 22; col. 16 l. 43 - col. 17 l. 12; col. 20 ll. 10-34; and Figures 1, 2, 4, and 6. In particular, the additional passage describes other “recording medi[a] for the inventive prerecorded control tracks,” col. 20 ll. 10-11, and there is no reason to believe that this passage is relevant structure for Function [3] but not also for Function [2].

*“means for prerecording a control track having music and/or control information corresponding to a music signal”* (claims 19 and 20)

All parties object to various aspects of the recommended construction for this term.

As with the previous term, PDIC objects to the Report’s conclusion that issue preclusion applies to the construction of the function. (D.I. 196 at 5-6) For the same reasons as above, the Court agrees with the Report’s analysis. During IPR, PDIC argued that the function for this term (which appears in independent claim 16) is “prerecording a control track having [music] and/or control information corresponding to a [music] signal.” (D.I. 118 Ex. 4 at 217-18) The PTAB agreed. (*See id.* at 401; *see also* D.I. 118 Ex. 3 at 394-95) PDIC is not now permitted to seek a construction whose function does not include music and control information. Accordingly, the

Court agrees that the function for this term is “[a] prerecording a control track having music corresponding to a music signal, [b] prerecording a control track having control information corresponding to a music signal, or [c] prerecording a control track having both music and control information corresponding to a music signal.” (D.I. 193 at 40)

Defendants object to the Report’s determination that Function [a] is not indefinite. (D.I. 195 at 2-6) In particular, Defendants rely on statements made by the PTAB during the IPRs that “[t]he Specification appears to make no mention of the function of prerecording a *control track* having only audio” and “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.” (D.I. 118 Ex. 3 at 396-97) The Report acknowledged these statements but disagreed with the PTAB’s analysis, citing to a portion of the specification that “disclose[s] prerecording a control track that includes music/audio information.” (See D.I. 193 at 29) (citing col. 20 ll. 10-20) Defendants do not now dispute that this passage gives structure to Function [c] (prerecording a control track having both music *and* control information corresponding to a music signal). (See D.I. 195 at 7; *see also* D.I. 193 at 29) Given that the patent undisputedly provides structure for Function [c], the Court agrees with the Report that “[t]he specification’s disclosure of prerecording a control track that has music *and* control information is adequate disclosure of [] prerecording a control track that has only music.” (D.I. 193 at 30) (emphasis added) Given the Court’s assessment of the intrinsic evidence, the Court is not persuaded that Defendants’ expert testimony should lead to a contrary conclusion.

Relatedly, Defendants also object to the Report’s recommendation that the same structure corresponds to Functions [a] and [c]. (D.I. 195 at 6-8) Defendants contend that, as a matter of

law, identifying the same structure for two functions is improper. (*See id.* at 7) (citing *Noah Sys., Inc. v. Intuit Inc.*, 675 F.3d 1302, 1318-19 (Fed. Cir. 2012)) This is incorrect. *See Intellectual Prop. Dev., Inc. v. UA-Columbia Cablevision of Westchester, Inc.*, 336 F.3d 1308, 1320 n.9 (Fed. Cir. 2003) (“[W]e see no reason why, as a matter of law, one claim limitation may not be responsive to another merely because they are located in the same physical structure.”); *Rodime PLC v. Seagate Tech., Inc.*, 174 F.3d 1294, 1305 (Fed. Cir. 1999) (“This passage, however, merely highlights the unremarkable fact that a particular means may perform more than one function.”); *StrikeForce Techs. Inc. v. PhoneFactor Inc.*, 2015 WL 5708577, at \*2 (D. Del. Sept. 29, 2015) (rejecting argument that *Noah*, 675 F.3d at 1319, “prohibits one structure from performing multiple functions”).

With respect to Functions [a] and [c], PDIC objects to the structure identified as corresponding to these functions, contending it is incomplete. (D.I. 196 at 6-7) Notably, the Report recommends the structure that PDIC advocated in its claim construction briefing. (*See* D.I. 193 at 30-31; D.I. 147 at 8-9) Although PDIC included the passages it now seeks to add in the slides it used during the claim construction hearing (*see* D.I. 197 at 7), it did not clearly call attention to these citations during that hearing in front of Judge Burke (*see* D.I. 182 at 178). However, despite PDIC’s less-than-clear presentation, the Court agrees that the processors described in some of these passages are necessary structure for “prerecording a track,” in particular descriptions at col. 13 ll. 21-31, 41-49, as they identify the structure that generates the control track that is prerecorded. That the processor is necessary structure is consistent with the recommended construction for Function [b] (which was proposed by Defendants), which includes “a microprocessor for generating a control track” (D.I. 193 at 34), and Defendants

identify no persuasive reason why Functions [a] and [c] should not also include processors.

However, PDIC also seeks to add lengthy passages of the patent without adequately articulating why such passages identify necessary structure. The Court agrees with PDIC that additional processor-based structure is necessary but only to the extent of what is described in column 13. According, the Court finds that the structure corresponding to Functions [a] and [c] is recited at col. 7 ll. 30-32; col. 8 l. 58 - col. 9 l. 3; col. 12 ll. 38-42, 57-62; col. 13 ll. 21-31, 41-59; col. 14 l. 55 - col. 15 l. 16; col. 20 ll. 10-20; and Figures 2 and 5.

Finally, PDIC objects to the Report's conclusion that statements it made during IPR operate as a prosecution history disclaimer regarding the structure of Function [b] (prerecording a control track having control information corresponding to a music signal). (D.I. 196 at 7-8) The Court agrees with the Report that PDIC's statements amount to a disclaimer of claim scope, as they make clear that the claimed invention does not cover situations in which "the control information . . . corresponds to time, position or location, not to an audio signal as required by the claims" – i.e., where "once the timer starts, the graphics are displayed irrespective of the audio content." (D.I. 118 Ex. 4 at 124-25) Thus, the Court also agrees with the Report's recommendation that the structure is limited to "(i) a first media player unit (e.g., four-track tape player, CD or DAT playback device), a microprocessor for generating a control track from the received data from the media player unit (based on the content of a sound recording itself, and not based merely on time, positions or locations within a sound recording), and a media recorder" (col. 13 ll. 11-31; col. 20 ll. 10-13); or "(ii) one or more input devices for inputting signals, a microprocessor for generating a control track from the received signals (based on the content of a sound recording itself, and not based merely on time, positions or locations within a sound


recording), and a media recorder” (col. 13 ll. 32-48; col. 20 ll. 10-13). (D.I. 193 at 34)

PDIC also objects to the Report’s construction of “control track is time shifted relative to the music signal” as “a pre-selected delay between music and control track[s] is implemented at the time when both the control tracks and the music are prerecorded.” (D.I. 196 at 8) The parties do not dispute that the patent describes two delay-compensation techniques. “One of the techniques is to shift the control tracks in time relative to the audio information (music tracks).” Col. 10 ll. 39-41. “The second one . . . is to delay the music that is being played (relative to the prerecorded control track which is also being played back).” Col. 10 ll. 52-54. Because the disputed claim language tracks the wording of the first technique (shifting the control track) – and language of another claim tracks the description of the second technique (delaying the music signal) – the Report concluded that this claim is directed only to the first technique. The Court agrees. Although the control track and music signal are delayed or shifted relative to each other, the patent uses different language to describe the two methods for accomplishing this shift. The claim language at issue here describes the method in which “[t]he control track is . . . phase shifted in advance to account for lags expected to be introduced by the analysis,” col. 10 ll. 25-27, and the Report’s construction uses the specification’s language for how this type of shift is achieved, *see* col. 10 ll. 22-25.

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Given the detailed reasoning provided in the Reports, the Court finds it unnecessary to address parties’ objections any further.

December 13, 2017  
Wilmington, Delaware

  
HON. LEONARD P. STARK  
UNITED STATES DISTRICT JUDGE