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Paper: 7
Entered: December 5, 2017

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

LG ELECTRONICS, INC.,
Petitioner,

v.

BROADCOM CORPORATION,
Patent Owner.

Case IPR2017-01544
Patent 7,342,967 B2

Before THOMAS L. GIANNETTI, PATRICK M. BOUCHER, and NORMAN H. BEAMER, *Administrative Patent Judges*.

GIANNETTI, *Administrative Patent Judge*.

DECISION
Institution of *Inter Partes* Review
37 C.F.R. § 42.108

On June 13, 2017, LG Electronics, Inc. ("Petitioner") filed a Petition (Paper 2, "Pet.") pursuant to 35 U.S.C. §§ 311–319 to institute an *inter partes* review of claims 1–5 of U.S. Patent No. 7,342,967 B2 ("the '967 patent"). On September 19, 2017, Broadcom Corporation ("Patent Owner") filed a Preliminary Response (Paper 6, "Prelim. Resp."). Applying the

standard set forth in 35 U.S.C. § 314(a), which requires demonstration of a reasonable likelihood that Petitioner would prevail with respect to at least one challenged claim, we grant the Petition and institute an *inter partes* review of claims 1–5.

I. BACKGROUND

A. The '967 Patent

The '967 patent is titled "System and Method for Enhancing Performance of Personal Video Recording (PVR) Functions on HITS Digital Video Streams." Ex. 1001. The patent relates to video recorder and playback systems, and more particularly to controlling the presentation of content. *Id.* col. 1, ll. 26–28.

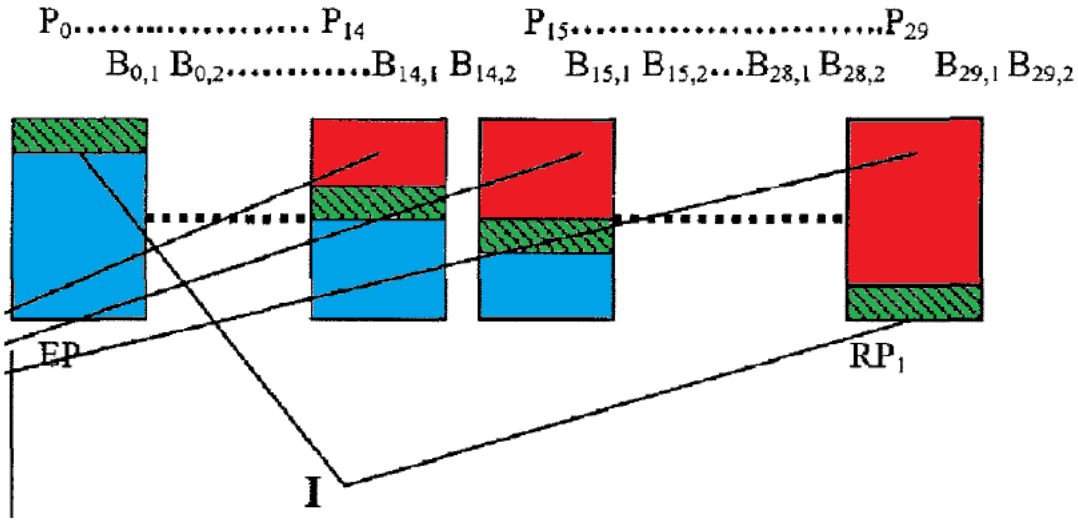
Currently, distribution of digital video content for TV display is dominated by use of the MPEG-2 video compression standard. *Id.* col. 1, ll. 30–33. An MPEG-encoded stream may have three types of pictures: Intra-coded (I), Predicted (P), and Bi-directionally predicted (B). I-pictures are not compressed using any temporal predictions and can be decoded without the need of any other picture. P-pictures perform temporal predictions from a picture that comes before it in the display order. B-pictures are bi-directionally predicted and use two pictures for prediction, one from the past and another from the future (in display order). *Id.* col. 1, ll. 35–47.

A special class of MPEG-2 streams, known as "Headend In The Sky" or "HITS" streams, do not include I-pictures, in order to increase the video compression and reduce the bandwidth required to transmit a video stream. Instead, HITS streams use a progressive refresh mechanism to build reference pictures. *Id.* col. 2, ll. 1–6.

The progressive refresh mechanism of HITS mandates that each P-picture have at least one intra-coded or I-slice, where a slice is 16 horizontal lines of pictures. *Id.* col. 2, ll. 6–9. Furthermore, the intra-coded slice(s) in a P-picture will be just below the intra-coded slice(s) of the previous P-picture, and the top slice is intra-coded for a P-picture following a P-picture with an intra-coded slice at the bottom of the picture. *Id.* col. 2, ll. 9–13.

Additionally, the HITS streams ensure that the slices above the intra-coded slice(s) predict only from those slices of the previous P-picture that are above the current I slice(s). *Id.* col. 5, ll. 53–56. Thus, the slices are progressively refreshed from top to bottom. *Id.* col. 2, ll. 19–20. This ensures that if a series of pictures is decoded starting from a P-picture whose first-slice is intra-coded, then a "clean" refreshed picture will be built after all slices have been progressively refreshed. *Id.* col 5, ll. 56–59.

The P-picture whose first-slice is intra-coded is called an Entry Point (EP) picture. The P-picture immediately before the EP picture, i.e., the P-picture with the I-slice(s) at the bottom of the picture, will be referred to as a clean reference picture RP. *Id.* col. 5, ll. 60–64. This is illustrated by Figure 4 of the '967 patent, reproduced below as annotated by Petitioner (Pet. 5):



In annotated Figure 4, each of a first P-picture P_{14} and second P-picture P_{15} includes slices (indicated in red) above an intra-coded slice (shaded in green), and slices (shaded in blue) below the intra-coded slice. Pet. 4. The downward progression of intra-coded slices from picture to picture enables predicting slices above an intra-coded slice in a later picture (e.g., P_{15}) based on only the slices of the previous P-picture (e.g., P_{14}) that are above the current intra-coded slice. *Id.*

During rewind of a HITS stream, the video decoder builds a clean reference picture.[1] The clean reference picture is built by decoding each of the P-pictures in the EP-EP segment. Ex. 1001, col. 2, l. 65–col. 3, l. 1. However, because the P-pictures are not displayed, the decoder does not decode the portion of the P-picture below the last I slice. *Id.* col. 3, ll. 1–3. The decoder can build the clean reference picture without decoding the portions of the P-pictures below the last I-slice because the subsequent

[1] Pausing, fast forwarding, rewinding, and skipping portions of the video stream are sometimes referred to as "trick modes." Delp Decl. ¶ 96.

pictures do not use those portions for prediction. *Id.* col. 3, ll. 3–7. Omitting decoding the portion of the P-pictures below the I-slice advantageously reduces the processing required to build a clean reference picture. *Id.* col. 3, ll. 8–10.

B. Illustrative Claims

Challenged claim 1 of the ’967 patent is the only independent claim. Claim 1 is reproduced here:

> 1. A system for displaying pictures, said system comprising:
>
> a host processor for transmitting transport packets, said transport packets providing a plurality of instructions;
>
> a video decoder for executing the plurality of instructions; and
>
> wherein execution of the instructions by the video decoder comprises causing:
>
> selecting a picture, said picture comprising an intracoded slice and at least one slice above the intracoded slice, and at least one slice below the intracoded slice;
>
> decoding the at least one slice above the intracoded slice;
>
> decoding the intracoded slice; and
>
> decoding at least a portion of another picture after decoding the at least one slice above the intracode slice and the intracode slice without having decoding the at least one slice below the intracoded slice.

Ex. 1001, col. 8, ll. 8–27.

C. References

Petitioner relies on the following patent publications:

MacInnis	US 2002/0061183 A1	Pub. May 23, 2002	Ex. 1003

Chen ’677 US 2001/0026677 A1 Pub. Oct. 4, 2001 Ex. 1004

Petitioner relies also on ISO/IEC Standard 13818-2:2000: “Information technology-Generic coding of moving pictures and associated audio information: Video.” Ex. 1009 (“ISO 13818-2”).

In addition, Petitioner provides an expert declaration of Dr. Edward J. Delp, which we have also considered. Ex. 1002 (“Delp Decl.”).

D. Asserted Grounds of Unpatentability

Petitioner challenges claims 1–5 over the following references:

Reference(s)	Claim(s)	Basis
MacInnis	1–5	§ 102(a)
MacInnis and ISO 13818-2	4	§ 103(a)
Chen ’677	1–4	§ 102(a)
Chen ’677	5	§ 103(a)
Chen ’677 and ISO 13818-2	1–5	§ 103(a)

E. Real Parties in Interest

Petitioner identifies LG Electronics, Inc. and LG Electronics U.S.A., Inc. as real parties in interest in this proceeding. Pet. 80.

Patent Owner identifies only itself as a real party in interest. Paper 4, 1.

F. Related Proceedings

The parties identify the following proceedings as involving the ’171 patent: (1) *Broadcom Corp. v. VIZIO, Inc.*, Case No. 8:17-cv-00408 (C.D. Cal.); (2) *Broadcom Corp. v. LG Elecs. Inc.*, Case No. 8:17-cv-00404 (C.D. Cal.); (3) *Broadcom Corp. v. Media Tek Inc.*, Case No. 8:17-cv-00405 (C.D. Cal.); and (4) *In re: Certain Semiconductor Devices and Consumer*

Audiovisual Products Containing the Same, 337-TA-1047 (USITC). Pet. 80; Paper 4, 1.

II. ANALYSIS

A. Claim Construction

The Board interprets claims of an unexpired patent using the broadest reasonable construction in light of the specification of the patent in which they appear. *See* 37 C.F.R. § 42.100(b); *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2144–46 (2016). Terms are given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art at the time of the invention. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). The broadest reasonable construction must be "consistent with the specification." *In re Morris*, 127 F.3d 1048, 1054 (Fed. Cir. 1997) (citation omitted); *see also In re Suitco Surface Inc.*, 603 F.3d 1255, 1259–60 (Fed. Cir. 2010).

While the claims must be read in view of the specification, limitations from the specification are not to be read into the claims. *Teleflex, Inc. v. Ficosa N. Am. Corp.*, 299 F.3d 1313, 1326 (Fed. Cir. 2002) (citations omitted). Even when the specification describes only a single embodiment, the claims of the patent will not be read restrictively unless the patentee has demonstrated a clear intention to limit the claim scope using words or expressions of manifest exclusion or restriction. *Liebel-Flarsheim Co. v. Medrad, Inc*., 358 F.3d 898, 906 (Fed. Cir. 2004) (citing *Teleflex, supra*).

Claim terms need only be construed to the extent necessary to resolve the controversy. *Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011).

1. "instructions"

This term appears in all claims. Petitioner proposes the following construction: "commands, separate from video or audio data that specify trick play functions to be performed." Pet. 12. Patent Owner responds that "[f]or the purpose of this preliminary response, Patent Owner is applying LG's proposed construction of the term 'instructions.'" Prelim. Resp. 5. We have considered Petitioner's construction and the supporting record citations. Pet. 12–13. Specifically, we have concluded that the intrinsic record supports Petitioner's conclusion that the broadest reasonable construction of the term "instructions" does not require that the commands be part of the contents of the compressed audio or video itself. *Id.* However, we are not convinced by Petitioner's argument that the commands necessarily must be separate from audio or video data. The references by Petitioner to certain embodiments in the specification of the '967 patent and its parent application at pages 12–13 of the Petition do not persuade us that we should read this limitation into the claims. *See Liebel-Flarsheim Co.*, 358 F.3d at 906. Nor are we persuaded that instructions should be limited to commands that specify trick play functions. The '967 patent describes handling the packets containing commands as follows:

> The data transport processor then de-multiplexes the TS [transport stream] into its PES constituents and passes the audio TS to an audio decoder 360 and the video TS to a video transport processor 340, and then to a MPEG video decoder 345 that is operable to decode and extract embedded, TS formatted command packets, that *may* include instructions to perform trick play functionality.

Ex. 1001, col. 5, ll. 7–13 (emphasis added). Thus, according to the specification, command packets may or may not include instructions for

performing trick play functions. Accordingly, we construe "instructions" as "commands that specify playback functions to be performed, including trick play functionality."

2. "host processor"

Although neither party expressly requested construction of this term, determining its meaning appears necessary. *See* discussion *infra*. Petitioner adopts a construction it states was proposed by Patent Owner in ITC Investigation No. 337-TA-1047, identified *supra* as a Related Proceeding. Pet. 54 (citing Ex. 1008). According to Petitioner, under that construction, a "host processor" is "any device or element that processes an incoming transport stream (i.e., a stream of packets), extracts the packets from the stream, and passes the packets on to a decoder device (such as any audio or visual decoding device or functionality)." *Id.* Patent Owner does not challenge this contention, referring to it as Petitioner's "own applied construction of the term." Prelim. Resp. 7.

We are not persuaded that this is the broadest reasonable construction consistent with the specification. Figure 1 of the '967 patent, reproduced below, shows host processor 110 as a box communicating with the decoder:

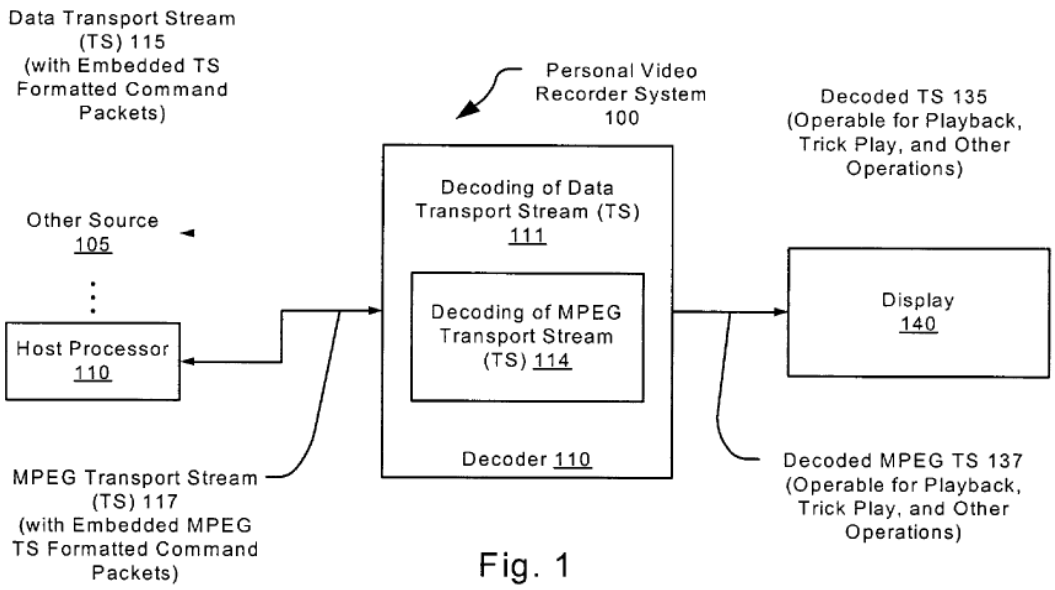


Fig. 1

Figure 1 of the'967 patent is a block system diagram of a personal video recording system. Ex. 1001, col. 3, ll. 23–25. The '967 patent specification describes the host processor as performing two functions: providing a data transport stream to decoder 120 and controlling the playback (including trick playback) of the data. *Id.* col, 3, ll. 45–50. Accordingly, consistent with the specification, we construe "host processor" as "a device or element that delivers an incoming transport stream (i.e., a stream of packets) that may contain instructions for controlling the playback to a decoder device (such as any audio or visual decoding device or functionality)."

3. Other Terms

Petitioner proposes constructions for two other terms appearing in the claims: "without having decoding the at least one slice below the intracoded slice," and "transport packet." Pet. 14–15. We determine that at this stage, construction of those terms is unnecessary.

B. Challenges Based on MacInnis

1. Overview of MacInnis (Ex. 1003)

MacInnis it titled "System and Method for Personal Video Recordings." MacInnis describes a system and method for implementing trick modes such as fast forward and reverse for digital audio-video systems. Ex. 1003 ¶ [0002]. MacInnis describes decoding of digital streams having no I-pictures such as HITS. *Id.* ¶ [0050]. Figure 4A of MacInnis and the accompanying text describe a video stream with no I-pictures in which the P-pictures include a pattern of I-slices that appear sequentially from top to bottom. An annotated version of Figure 4A from the Petition (Pet. 19) follows:

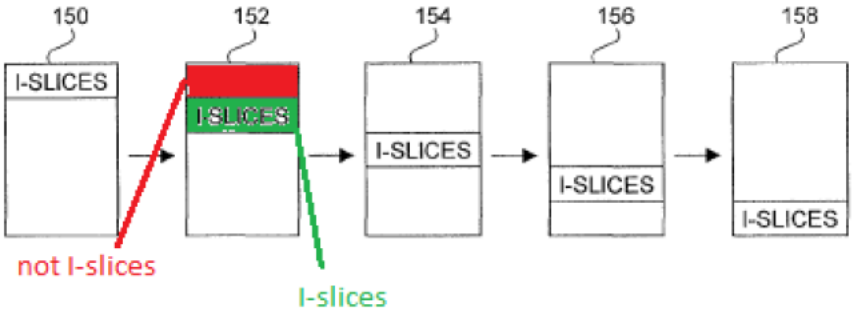


FIG. 4A

Figure 4A of MacInnis (annotated) illustrates changes to the location of I-slices in a block of pictures without I-pictures. Ex. 1003 ¶ [0018]. The I-slices move down until all rows in the consecutive sequence of pictures have been represented in I-slices. Pet. 19 (citing Ex. 1003 ¶¶ [0056]–[0057]). MacInnis also describes a system for implementing reverse play. *Id.* ¶¶ [0108]–[0119]; Pet. 19–23.

2. Anticipation of Claims 1–5 by MacInnis

Petitioner sets forth an element-by-element analysis of claim 1 of the '967 patent in relation to MacInnis at pages 23–38 of the Petition. Petitioner contends that each element of claim 1 is met by MacInnis. For example, the claim recites "a host processor for transmitting transport packets, said transport packets providing a plurality of instructions." Petitioner provides alternative analyses of this element. Pet. 25–28. The first assumes the term "instructions" is construed as "commands, separate from video or audio data that specify trick play functions to be performed." Pet. 25. Under this construction, Petitioner identifies CPU 113 in MacInnis as meeting this limitation. *Id.* at 27. According to Petitioner, "CPU 113 inserts into the stream transport packets that contain commands, separate from video or audio data, that specify trick play functions to be performed (i.e., 'instructions') into a stream for transmission to video transport processor 118 and video decoder 120." Pet. 27.

Petitioner's alternative analysis assumes that "instructions" are "the contents of the coded or compressed audio or video syntax itself." *Id.* Because we were not persuaded to adopt this construction, we do not consider this alternative analysis. We have, instead, construed "instructions" as "commands that specify playback functions to be performed, including trick play functionality." *See supra*. We determine that under either this construction or the construction proposed by Petitioner, this element is met by MacInnis. Furthermore, we determine that the other elements of claim 1 are met by MacInnis for the reasons advanced by Petitioner.

Patent Owner responds that this anticipation challenge fails because Petitioner does not explain how the instructions "*cause* the system to

perform the slice decoding steps described in claim 1." Prelim. Resp. 8. According to Patent Owner, MacInnis's slice decoding process "occurs irrespective of the commands received." *Id.* at 8. We are not persuaded by this argument. According to MacInnis, "CPU 113 preferably reads the [MPEG transport stream] data from the storage device 102 based on the user selected playback mode." Ex. 1003 ¶ [0036]. Further: "CPU 113 may control the data transport processor 116 and/or the video transport processor 118 to implement trick modes." *Id.* ¶ [0037]. Still further,

> [A] data transport driver (DTD) which preferably runs in the CPU 113, preferably is responsible for data flow of the stream to be played back through the data transport processor 116 and/or the video transport processor 118. The DTD in this embodiment also preferably inserts a command transport packet containing various commands to the video transport processor 118 and the video decoder 120. *The inserted transport packet preferably contains command fields for controlling the data flow of the MPEG video stream during play back . . . .*

Id. ¶ [0040] (emphasis added).

We have construed "instructions" as "commands that specify playback functions to be performed, including trick play functionality." We are persuaded by Petitioner's argument that the "causing" limitation is met by this operation in MacInnis in which the transport packets deliver commands that control the playback. Pet. 29.

In view of the foregoing, and on this record, we are persuaded that Petitioner has established a reasonable likelihood of prevailing on its anticipation challenge to claim 1 based on MacInnis.

We reach the same conclusion as to claims 2–5. Petitioner provides element-by-element claim analyses for each of these claims in relation to MacInnis. Pet. 38–47. Petitioner contends that each element of claims 2–5

is met by MacInnis. For example, as to claim 4, Petitioner asserts that the claim element "decoding the at least one slice in raster order" is met by the description in MacInnis of decoding I-slices from top to bottom. Pet. 45–46 (citing Fig. 4A of MacInnis, reproduced *supra*).

Patent Owner does not present separate arguments as to these dependent claims. We have reviewed Petitioner's claim analyses and find them persuasive. In view of the foregoing, and on this record, we are persuaded that Petitioner has established a reasonable likelihood of prevailing on its anticipation challenge to claims 2–5 based on MacInnis.

3. Obviousness of Claim 4 over MacInnis and ISO 13818-2

Petitioner presents this ground as an alternative, "to the extent that [Patent Owner] argues or the Board finds, before or after institution, that *MacInnis* does not expressly disclose 'decoding the at least one slice in raster order.'" Pet. 47–48. Petitioner relies on ISO 13818-2 for this feature only. *Id.* Petitioner points out that MacInnis specifically refers to the rows and slices defined in ISO 13838-2. Pet. 48 (citing Ex. 1003 ¶ [0054]). Petitioner further points out that ISO 13838-2 refers to "proceeding by raster scan order" and describes a top to bottom order of decoding. *Id.* at 48–49. On this record, we are persuaded that a person of ordinary skill would have found it obvious to implement the teachings of *MacInnis* so as to decode at least one slice in raster order as taught in ISO 13818-2. *Id.* at 49. In view of the foregoing, we are persuaded that Petitioner has established a reasonable likelihood of prevailing on this challenge to claim 4.

C. Challenges Based on Chen '677

1. Overview of Chen '677 (Ex. 1004)

Chen '677 is titled "Methods and Apparatus for Transcoding Progressive I-slice Refreshed MPEG Data Streams to Enable Trick Play Mode Features on a Television Appliance." Chen '677 describes decoding progressive I-slice refreshed MPEG data streams to facilitate trick play modes on a television appliance. Ex. 1004 ¶ [0002]. Figure 1 of Chen '677, reproduced below, provides an example of such a stream:

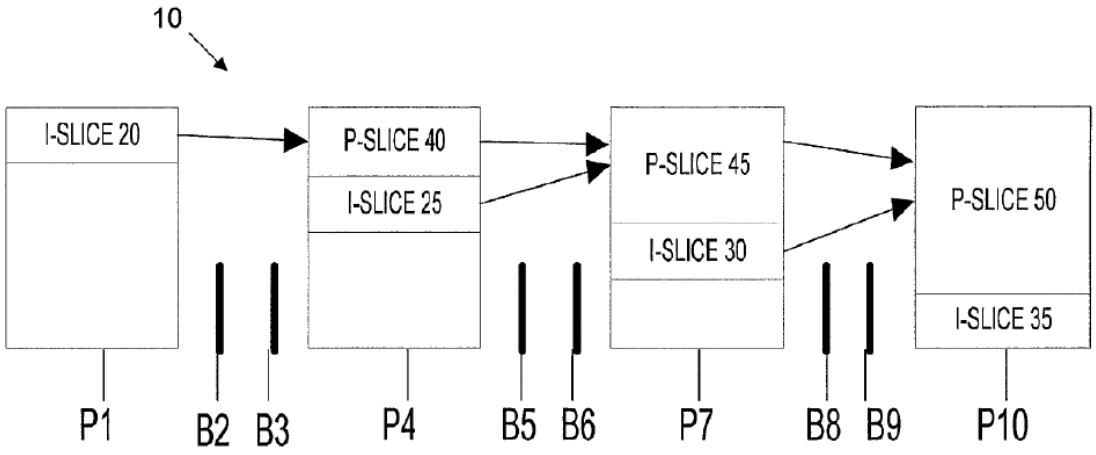


Figure 1 of Chen '677 shows a video stream where the I-frame is divided into slices and spread across P-frames. Chen '677 explains that those skilled in the art will appreciate that the P-frames need only be partially decoded in order to recover the I-slices. *Id.* ¶ [0025]. Reconstructing a P-frame requires decoding at least the previous frame. *Id.* ¶ [0022]. For example, I-slice 25 and P-slice 40 in P-frame P4 provide

"reference macroblocks" that can be used to predict the contents of P-slice 45 in P-frame P7. *Id.* ¶ [0023].

2. Anticipation of Claims 1–4 by Chen '677

Petitioner sets forth an element-by-element analysis of claims 1–4 of the '967 patent in relation to Chen '677 at pages 53–73 of the Petition. Petitioner contends that each element of claims 1–4 is met by Chen '677. For example, to meet the claim limitation "a host processor for transmitting transport packets, said transport packets providing a plurality of instructions," Petitioner states:

> Because MPEG streams are stored and sent in the form of packetized streams, and because *Chen '677* teaches a receiver 210 that receives an MPEG stream 10 and extracts data in the form of packets from the MPEG stream, and, *Chen '677* teaches that the "plurality of instructions" transmitted by a "host processor" is stored and sent in a series of "transport packets."

Pet. 58. In this analysis, Petitioner relies on a construction of "instructions" that would include "the contents of the coded or compressed audio or video syntax itself." *Id.* at 55. Our construction is similar in this respect.

Patent Owner responds with two main arguments. First is that Chen '677 does not disclose "instructions" under Petitioner's "own proposed construction." Prelim. Resp. 5–6. Second is that Chen '677 does not disclose a "host processor." *Id.* at 6–7.

As to the first argument, we have construed "instructions" as not necessarily separate from audio or video data. *See supra*. Accordingly, we determine on this record that Chen '677 meets this limitation, for Chen '677's data stream contains commands that specify trick play functions to be performed. Ex. 1004 ¶ [0027].

According to Patent Owner, Chen '677's receiver 210 does not meet the requirement of a host processor because it does not process an incoming transport stream or extract packets from the stream, as required by Petitioner's "own" construction of the term. Prelim. Resp. 6. As discussed *supra*, Patent Owner is referring here to the construction of "host processor" used in its submission to the ITC. *See* Ex. 1008.

Consistent with the '967 patent specification, however, our construction of "host processor" does not require processing an incoming stream or extracting packets from the stream. *See supra*. Accordingly, we determine on this record that Chen '677 meets this limitation, for Chen '677's receiver 210 delivers an incoming transport stream (i.e., a stream of packets) which contain instructions for controlling the playback to a decoder device.

3. Obviousness of Claim 5 over Chen '677

Claim 5 reads: "The system of claim 1, wherein the picture comprises a P-picture from a HITS stream." Petitioner contends:

> Given that the streams in *Chen '677* are progressive I-slice refreshed MPEG data streams, of which HITS is a type of stream, a POSITA would have found it obvious to implement the teachings of *Chen '677* over a HITS stream. Such implementation would have been a straightforward substitution.

Pet. 73 (citing Ex. 1002 ¶ 203). Patent Owner does not challenge this assertion. We are persuaded on this record that Petitioner has established a reasonable likelihood of prevailing on this challenge.

4. Obviousness of Claims 1–5 over Chen '677 and ISO 13818-2

Petitioner presents this ground as an alternative, "[t]o the extent that [Patent Owner] argues or the Board finds, before or after institution, that *Chen '677* does not disclose one or more of the claimed 'transport packets'

(claim 1), or 'raster order' (claim 4)." Pet. 74. Petitioner relies on ISO 13818-2 for these features. *Id.* at 74–78. As to "transport packets," Petitioner contends:

> A POSITA would have considered "transport packets providing a plurality of instructions" obvious in view of the combined disclosures of *Chen '677* and *ISO 13818-2*. EX-1002 ¶212. Applying the known techniques of *ISO 13838* [sic] in *Chen '677* would have yielded predictable results and known advantages. EX-1002 ¶212.

Pet. 76. As to "raster order," Petitioner contends:

> Having started with *ISO 13818-2* when implementing the teachings of *Chen '677*, based on these disclosures of *ISO 13818-2*, a POSITA would have found it obvious to implement the teachings of *Chen '677* so as to decode at least one slice in raster order. EX-1002 ¶218. . . . Because *ISO 13818-2* explains that MPEG data (such as in *Chen '677)* is encoded in raster order, decoding in raster order would be the most straightforward method of decoding. EX-1002 ¶218.

Pet. 78. Patent Owner does not challenge these assertions. We are persuaded by the foregoing that, on this record, Petitioner has established a reasonable likelihood of prevailing on this challenge.

III. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that the Petition is granted and *inter partes* review is of the '967 patent is instituted on the following grounds:

A. Anticipation of claims 1–5 by MacInnis;

B. Obviousness of claim 4 over MacInnis and ISO 13818-2;

C. Anticipation of claims 1–4 by Chen '677;

D. Obviousness of claim 5 over Chen '677; and

E. Obviousness of claims 1–5 over Chen '677 and ISO 13818-2;

FURTHER ORDERED that *inter partes* review based on any other proposed grounds of unpatentability is not authorized; and

FURTHER ORDERED that pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is hereby given of the institution of a trial commencing on the entry date of this decision.

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