

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

AMAZON.COM, INC., AMAZON.COM SERVICES, LLC,
Petitioner

v.

NOKIA TECHNOLOGIES OY,
Patent Owner

Case: IPR2024-00691
U.S. Patent No. 8,050,321

PATENT OWNER'S REQUEST FOR DIRECTOR REVIEW

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The Board granted institution of *inter partes* review of claims 8-11 (“the Challenged Claims”) of U.S. Patent 8,050,321 B2 (Ex. 1001, the “’321 patent”). Paper 10 (“Decision” or “Dec.”). In doing so, the Board made clearly erroneous fact findings regarding the disclosures of MPEG-1 and Kim. Those findings were critical in the Board’s grant of institution.

The Challenged Claims are decoding claims. That is, the claims describe the operations of decoders, not encoders. The Challenged Claims each require a decoder (or decoding process) to “reset the identifier value for the indicated first image frame of the independent sequence.” This requirement has meaning. To meet the claims, a decoder must perform resetting. However, for both grounds raised by the Petition (MPEG-1 and Kim), the Board erred in relying on disclosures about parameter values in encoded bitstreams—i.e., bitstreams produced by encoders. That is, the disclosures of MPEG-1 and Kim the Board relied on were disclosures about what a decoder receives, not what a decoder processes or alters, and thus cannot disclose the required resetting limitations.

I. LEGAL STANDARD

“Requests for Director Review of the Board’s decision whether to institute an AIA trial ... shall be limited to decisions presenting (a) an abuse of discretion or (b) important issues of law or policy.” USPTO, Revised Interim Director Review Process, Sec.2.B., <https://www.uspto.gov/patents/ptab/decisions/revised-interim->

[director-review-process](#) (last updated 1/19/2024). “An abuse of discretion is found if [a] decision: (1) is clearly unreasonable, arbitrary, or fanciful; (2) is based on an erroneous conclusion of law; (3) rests on clearly erroneous fact finding; or (4) involves a record that contains no evidence on which the Board could rationally base its decision.” *Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1367 (Fed. Cir. 2016) (internal citation omitted).

II. BACKGROUND

A. Technical Background

The Challenged Claims of the ’321 patent relate to an improvement in video decoding that enables a decoder to identify where start a decoding process—a solution to an existing prior art problem related to random access when playback of a video sequence does not start from the beginning but rather at some later point. The ’321 patent described the problem in the prior art as “relate[d] to detection of image frames from which a decoder can start the decoding process. The detection is useful for multiple purposes. For example, an end-user may wish to start browsing a video file from the middle of a video sequence. Another example relates to starting the reception of a broadcast or multicast video transmission from the middle of the video transmission. A third example relates to on-demand streaming from a server and occurs when an end-user wishes to start playback from a certain position of a

stream.” EX1001, 3:62-4:5. Specifically, one issue with random access is in how prior art frames are numbered, and as the Board noted

[t]he ’321 patent explains that a ‘problem in the numbering of image frames arises when the user wishes to start browsing a video file in the middle of a sequence.’ Ex. 1001, 11:11-13. In particular, when the user resumes browsing a video file from ‘a random point after previous browsing, discontinuity typically occurs in the image numbering. *Id.* at 11:20-22. As a result, the ‘decoder typically interprets this as unintentional loss of image frames and unnecessarily tries to reconstruct the image frames suspected as lost.’ *Id.* at 11:22-25.

Dec. at 4-5.

For playback, it is important that a decoder can identify a coded video frame (picture) from which it is guaranteed that a decoder can begin decoding independently, for example to enable playback from or seeking to a particular position in a coded video stream (random access). EX2001, ¶¶ 48-49. Thus, the indication of a first image frame and resetting the identifier values to avoid any discontinuity are important to best initiate playback at the decoder. *See* EX100, 11:11-49.

B. The '321 Patent

The '321 patent endeavors to enhance random access by defining an “‘initiation image’ in an ‘independently decodable’ GOP that is ‘activated at the random point of the video file, and the number of the initiation image is set at zero.’” Dec. 5 (citing EX1001, 11:26-30). The Challenged Claims focus on enabling the decoder to handle random access. As the Board stated, “the '321 patent explains that ‘the idea of the present invention is to determine an initiation picture in an independently decodable group of pictures, whereby in the decoding phase any picture prior to said initiation picture is defined as unusable for reference.’” Dec. 5 (citing EX1001, 4:31-35). “Thus, ‘after decoding the initiation picture, all following pictures of the independently decodable sequence can be decoded without prediction from any picture decoded prior to said initiation picture.” Dec. 5 (citing EX1001, 4:35–38).

C. The Prior Art

1. MPEG-1

MPEG-1 Video (ISO/IEC 11172-2, “MPEG-1”) is a standard developed by the Moving Pictures Expert Group, a subgroup of the ISO/IEC standardization body, which was approved in 1993. MPEG-1 is an international standard that “specifies the syntax and semantics of the bitstream and the signal processing in the decoder.”

EX1005 at 14¹.

MPEG-1 defines a Group of Pictures or GOP, and requires decoders to be able to decode a GOP that meets all the following properties:

D.5.2 Group of pictures

Two distinct picture orderings exist, the display order and the bitstream order (as they appear in the video bitstream). A group of pictures (gop) is a set of pictures which are contiguous in display order. A group of pictures must contain at least one I-picture. This required picture may be followed by any number of I and P-pictures. Any number of B-pictures may be interspersed between each pair of I or P-pictures, and may also precede the first I-picture.

Property 1. A group of pictures, in bitstream order, must start with an I-picture and may be followed by any number of I, P or B-pictures in any order.

Property 2. Another property of a group of pictures is that it must begin, in display order, with an I or a B-picture, and must end with an I or a P-picture. The smallest group of pictures consists of a single I-picture, whereas the largest size is unlimited.

¹ Patent Owner uses the page numbering adopted by the Board, which are the page numbers that Petitioner applied to the exhibit rather than the page numbers that appear in the publication. Dec. 12 n.5.

The original concept of a group of pictures was a set of pictures that could be coded and displayed independently of any other group. In the final version of this part of ISO/IEC 11172 this is not always true, and any B-pictures preceding (in display order) the first I-picture in a group may require the last picture in the previous group in order to be decoded. Nevertheless encoders can still construct groups of pictures which are independent of one another. One way to do this is to omit any B-pictures preceding the first I-picture. Another way is to allow such B-pictures, but to code them using only backward motion compensation.

Property 3. From a coding point of view, a concisely stated property is that a group of pictures begins with a group of pictures header, and either ends at the next group of pictures header or at the next sequence header or at the end of sequence, whichever comes first.

Some examples of groups of pictures are given below:

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I
I P P
I B P B P
B B I B P B P
B B I B B P B B P B B P
B I B B B B P B I B B I I

```

Figure D.17 -- Examples of groups of pictures in display order

These examples illustrate what is possible, and do not constitute a suggestion for structures of groups of pictures.

EX1005, 84-85 (providing examples of Group of Pictures for MPEG-1); EX2001, ¶¶ 52-53.

MPEG-1 dictates that a decoder must decode any configuration of “Closed GOPs” in the bitstream:

Closed GOP

A one bit flag follows the time code. It denotes whether the group of pictures is open or closed. Closed groups can be decoded without using decoded pictures of the previous group for motion compensation, whereas open groups require such pictures to be available.

A typical example of a closed group is shown in figure D.18a.

I	B	B	P	B	B	P	B	B	P	B	B	P
0	1	2	3	4	5	6	7	8	9	10	11	12

(a) closed group

B	B	I	B	B	P	B	B	P	B	B	P	B	B	P
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14

(b) open or closed group

Figure D.18 -- Example groups of pictures in display order

A less typical example of a closed group is shown in figure D.18b. In this example, the B-pictures which precede the first I-picture must use backward motion compensation only, i.e. any motion compensation must be based only on picture number 2 in the group.

If the closed_gop flag is set to 0 then the group is open. The first B-pictures that precede the first I-picture in the group may have been encoded using the last picture in the previous group for motion compensation.

MPEG-1 at D.5.2 (“Group of pictures”).

MPEG-1 also provides a “Temporal Reference,” which is encoded as a syntax element temporal_reference that is part of the Picture Layer syntax, i.e., it is a syntax element that is associated with a specific coded picture. EX1005, 38. MPEG-1 explains that “Temporal Reference” can be used to define “the order in which the pictures must be displayed.” For a given group of pictures (whether open or closed), the first picture in display order has a Temporal Reference of zero:

D.5.3.2 Temporal reference

The Temporal Reference is a ten-bit number which can be used to define the order in which the pictures must be displayed. It may be useful since pictures are not transmitted in display order, but rather in the order which the decoder needs to decode them. The first picture, in display order, in each group must have Temporal Reference equal to zero. This is incremented by one for each picture in the group.

Some example groups of pictures with their Temporal Reference numbers are given below:

Example (a) in display order	I	B	P	B	P								
	0	1	2	3	4								
Example (a) in decoding order	I	P	B	P	B								
	0	2	1	4	3								
Example (b) in display order	B	B	I	B	B	P	B	B	P	B	B	P	
	0	1	2	3	4	5	6	7	8	9	10	11	
Example (b) in coded order	I	B	B	P	B	B	P	B	B	P	B	B	
	2	0	1	5	3	4	8	6	7	11	9	10	
Example (c) in display order	B	I	B	B	B	B	P	B	I	B	B	I	I
	0	1	2	3	4	5	6	7	8	9	10	11	12
Example (c) in coded order	I	B	P	B	B	B	B	I	B	I	B	B	I
	1	0	6	2	3	4	5	8	7	11	9	10	12

Figure D.19 -- Examples of groups of pictures and temporal references

EX1005, 87-88; EX2001, ¶¶ 59-61. This is different from the “coded order” of the pictures, which defines the order that the pictures are decoded. As illustrated in Figure D.19, the coded order for a picture can be different from the temporal order. MPEG-1 does not disclose its decoding process to include any resetting of any temporal reference value (or any indicator of display or coded order).

2. Kim

Kim is directed to a time lapse recording/reproduction device and method. Specifically, Kim describes recording, compressing, and reproducing intermittently recorded image data. Examples of where this type of technology is applied are in banks or other security-sensitive areas. In such implementations, pictures are

recorded intermittently and then stored in a database. These individual images can be reproduced when needed. EX2001, ¶70.

Petitioner relied heavily on Fig. 4 and 5A of Kim. According to Kim, FIG. 5A describes a bitstream that is generated and transmitted to the decoder (i.e., the bitstream was generated by the encoder, not the decoder):

The bit stream generated and transmitted to the recording/
reproducing unit **140** as described above has a logical
structure as shown in, e.g., FIG. 5A. As shown therein, each
P-picture frame P1, P2, P3 has a current address CAD
50 indicating the current address of the P-picture, and an
I-picture reference address IAD indicating the address of the
corresponding (or previous) I-frame. If image signals are

Kim at 4:46-52.

Further, Kim discloses in Fig. 4 and the corresponding specification description a decoding method where “[i]n step S30, the ‘image data corresponding to the user’s request is transmitted and decoded’ by a decoder.” Dec. 49 (citing EX1006, 5:29-31, Fig. 4). Further, the “decoding process ‘involves reverse-quantization and reverse-transformation to restore the original image data prior to data compression carried out during recording.’” Dec. 49 (citing EX1006, 5:31-34). Then, “[i]n step S31, the ‘property (type),’ i.e., either I-picture type or P-picture type, of the ‘currently restored image data is determined’ and ‘transmitted to the controller.’” Dec. 49 (citing EX1006, 5:34-37, Fig. 4). “[I]f the ‘currently restored image data is detected to be P-picture frame data’ in step S32, the controller ‘stores

the current reproduction position' in step S33." Dec. 49 (citing EX1006, 5:38-41, Fig. 4). Then, "[i]n step S34, the controller 'detects the address of the corresponding I-picture frame,' e.g., using the I-picture reference address (IAD) as shown in Figure 6's bitstream B2, from the 'reproduced image data provided by the demultiplexer.'" Dec. 50 (citing EX1006, 5:41-44, Fig. 4). Further steps then either combine the frame data to provide the full screen image data to the user's request or, if an I-picture, present that information based on the user's request. *See* Dec. 50 (referring to steps S35 to S39). Kim does not disclose the decoding process of Fig. 4 to include any resetting of any IAD value.

III. ARGUMENT

The Board's decision should be vacated and institution denied because the Board abused its discretion in finding that Petitioner had a reasonable likelihood of prevailing on its two raised grounds (MPEG-1 and Kim).

In both instances, the Board abused its discretion by making clearly erroneous fact finding by relying on disclosures regarding encoded bitstreams in MPEG-1 and Kim, which are produced by encoders and necessarily exist before ever being received by a decoder, to satisfy the "resetting" limitations in the Challenged Claims that must be done by decoders. The disclosures the Board relied on do not disclose actions by a decoder.

A. MPEG-1.

The Board abused its discretion in finding that MPEG-1 discloses limitations 8[d]/10[d]/11[d], which require resetting the identifier value for the indicated first image frame of the independent sequence. *See, e.g.*, EX1001, 24:9-10 (limitation 8d). By pointing to MPEG-1 disclosures about possible configurations of encoded bitstreams for the “resetting” limitation, the Board erred in relying on encoded bitstreams for limitations that require the decoder, not the encoder, to perform resetting.

First, the Board erred because it relied MPEG-1’s disclosure of the Temporal Reference being equal to zero in a coded bitstream (before it reaches the decoder) instead of on any disclosure that the decoder resets an indication. Dec. 35-36 (“And the Temporal Reference is ‘reset to zero’ for the next closed GOP with an I-picture as the first picture in display order.”) (citing to EX1005, 44, EX1003, ¶¶ 109-110).

That is, the Temporal Reference parameter has a value of zero in the encoded bitstream configurations pointed to by the Board, but this is not a resetting performed the decoder because the bitstream is simply what the decoder receives. Even if an identifier value is set to zero in a bitstream by an encoder, the Challenged Claims still require that the identifier value be reset to zero by a decoder.

This is important because, as described above, one of the aims of the ’321 patent’s invention is improved random access. As described by the ’321 patent

specification, prior art issues relating to frame numbering “can be avoided *in the decoder* by defining an initiation image in an independently decodable Group of Pictures GOP that is activated at the random point of the video file, and the number of the initiation image is set at zero.” EX1001, 11:26-30. Thus, even if an encoder originally set an identifier value to zero, the ’321 patent notes the benefit of the decoder itself setting the identifier value of the initiation frame to zero at the decoder so that it can begin decoding the video sequence without the issues associated with discontinuity. *See* EX1001, 11:11-25.

Additionally, the Board clearly erred in finding that the Temporal Reference being reset to zero “for the next closed GOP” discloses the resetting limitation. The Board relied on this, stating “the Temporal Reference is ‘reset to zero’ *for the next closed GOP with an I-picture as the first picture in display order.*” Dec. 35-36 (emphasis added). But, even putting aside that the Board is relying on disclosures pertinent to the encoded bitstreams (rather than actions of a decoder), resetting an identifier value for a different independent sequence does not disclose this limitation because the claims require that the indicator value for the independent sequence (or GOP) being decoded is reset by the decoder.

The claim language states “resetting the identifier value for the indicated first image frame of *the independent sequence.*” EX1001, 24:9-10 (limitation 8d). *The independent sequence* refers to the antecedent basis of “an independent sequence”

in limitation 8[a]. The Board held that “an independent sequence” is disclosed by MPEG-1 “because MPEG-1 discloses a closed GOP.” Dec. 21-22. The closed GOP being decoded is the independent sequence under the Board’s analysis. But, under that analysis, the resetting must be performed by a decoding process for the Temporal Reference of *that* closed GOP being decoded. Instead, however, the Board relied on the Temporal Reference being reset (in the context of an encoded bitstream) “*for the next closed GOP with an I-picture as the first picture in display order.*” Dec. 35-36 (emphasis added.). That is, the Board pointed to alleged resetting for the *next* independent sequence, not the independent sequence that is the antecedent basis for limitation 8[d]. Thus the Board erred in its factual conclusions and limitation 8[d] is not disclosed by MPEG-1.

The Director should find that the Board so erred and that Petitioner failed to show a reasonable likelihood of success for Grounds 1 and 2.²

B. Kim.

The Board abused its discretion in finding that Kim discloses the “resetting” limitations. Specifically, the Board misinterpreted the bitstreams disclosed in Kim, which are produced by encoders, to find that Kim discloses a decoder “resetting” the

² Ground 2 refers to dependent claim 9, and because Claim 8 is not disclosed, neither is claim 9.

identifier value as in the Challenged Claims. The only disclosure in Kim that addresses how the IAD (Petitioner's identifier value) is set to 0000 is that the encoder does so.

The Board acknowledges Patent Owner pointed out that “Kim lacks ‘any disclosure that the decoder is doing any logical addressing, let alone any resetting.’” Dec. 62. The Board then notes Kim states “In Step S13, the MUX 130 selectively outputs the I-picture data (or P-picture data), the camera ID code, and the address of the I-picture data received from the encoder 110, the recording DSP 120 and controller 150, and generates a bit stream of certain bytes for each frame.” Dec. 62 (quoting POPR at 36-37, which quotes EX1006, 4:38-42)). This disclosure in Kim refers to an encoding process. *See* EX1006, Fig. 3 (iterating numerous encoding steps, including step S13). This is the only disclosure in Kim that refers to addressing the IAD values.

The Board discounts the fact this disclosure is about what an encoder does by saying that “[t]he disclosure that an encoder generates an address for an I-picture and a multiplexer generates a bitstream does not preclude resetting the IAD component of each logical address to zero for each I-picture” and that “regardless whether the parts of Kim’s specification use words to describe resetting the IAD component of each logical address to zero for each I-picture, Figure 5A still discloses

that feature.” Dec. 63. This ignores that “that feature” must be performed by a decoder, not an encoder.

The Board acknowledged that Fig. 5A “illustrates the ‘logical structure’ of an example bitstream ‘generated and transmitted’ to a recording/reproduction unit.” Dec. 45. This cannot show that the decoder resets the identifier value because the bitstream is what is received by the decoder. That is, the bitstream is “generated and transmitted” *to* the decoder for decoding and therefore cannot disclose that the *decoder* resets a value to zero simply because that value was zero when it was received by the decoder. Thus, the Board erred in finding that Kim discloses the “resetting” limitations.

IV. CONCLUSION

The Board made clearly erroneous findings of fact that taint its bases for finding reasonable likelihoods of success for each of grounds one through three. As a result, Patent Owner requests that the Director grant the review and deny institution.

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Respectfully submitted,

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CERTIFICATION OF SERVICE

The undersigned hereby certifies that a copy of this **PATENT OWNER'S REQUEST FOR DIRECTOR REVIEW** is being served on the director via electronic mail, in its entirety, at Director_PTABDecisionRevie@uspto.com and on counsel for Petitioner via email, in its entirety, on the on the following counsel of record for Petitioner:

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