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**Datasheet for the decision  
of 16 November 2018**

**Case Number:** T 1932/13 - 3.5.04

**Application Number:** 01986977.5

**Publication Number:** 1340372

**IPC:** H04N5/93, H04N5/781

**Language of the proceedings:** EN

**Title of invention:**

System and method for special reproduction modes of a digitally encoded video data stream

**Applicant:**

Broadcom Corporation

**Headword:**

**Relevant legal provisions:**

EPC 1973 Art. 56

**Keyword:**

Inventive step - (no)

**Decisions cited:**

T 0506/95

**Catchword:**



**Beschwerdekammern**  
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Case Number: T 1932/13 - 3.5.04

**D E C I S I O N**  
**of Technical Board of Appeal 3.5.04**  
**of 16 November 2018**

**Appellant:** Broadcom Corporation  
(Applicant) 5300 California Avenue  
Irvine, CA 92617 (US)

**Representative:** Bosch Jehle Patentanwaltsgesellschaft mbH  
Flüggelstraße 13  
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**Decision under appeal:** **Decision of the Examining Division of the  
European Patent Office posted on 2 April 2013  
refusing European patent application  
No. 01986977.5 pursuant to Article 97(2) EPC.**

**Composition of the Board:**

**Chairman** C. Kunzelmann  
**Members:** R. Gerdes  
T. Karamanli

## Summary of Facts and Submissions

- I. The appeal is against the decision to refuse European patent application No. 01 986 977.5, published as international application WO 02/43385 A2.
- II. In the decision under appeal, reference was made to the following documents:

D1: US 5 726 711 A and  
D2: WO 99/57894 A1.

The examining division refused the patent application on the grounds that the subject-matter of the independent claims of the main request and of the first auxiliary request lacked inventive step in view of D1 and the common general knowledge of the skilled person. The subject-matter of the independent claims of the second and third auxiliary requests was found to lack inventive step in view of D2 if combined with D1 or D1 if combined with D2.

- III. The applicant/appellant filed notice of appeal against this decision requesting that it be set aside. With its statement of grounds of appeal, it submitted claims of a main request and first to third auxiliary requests which were identical to those underlying the decision under appeal.

- IV. The board issued a summons to oral proceedings and stated in its communication annexed to the summons that it considered, *inter alia*, the examining division's reasoning regarding lack of inventive step of the subject-matter of the independent claims of the second and third auxiliary requests based on document D2 as the closest prior art to be essentially correct and to

apply, *a fortiori*, to the subject-matter of the independent claims of the main and first auxiliary requests.

V. The appellant replied to the board's communication with a letter dated 16 October 2018 and submitted amended claims according to a new first auxiliary request. It requested that the former first to third auxiliary requests be renumbered as new second to fourth auxiliary requests.

VI. Oral proceedings were held before the board on 16 November 2018.

Inventive step of the subject-matter of claim 1 of each of the main and first to fourth auxiliary requests in view of document D2 as the closest prior art in combination with common general knowledge was discussed.

The appellant's final requests were that the decision under appeal be set aside and that a European patent be granted on the basis of the claims of the main request filed with the statement of grounds of appeal or of one of the first auxiliary request filed with letter of 16 October 2018, or the second to fourth auxiliary requests filed as auxiliary requests 1 to 3 with the statement of grounds of appeal.

VII. Claim 1 of the main request reads as follows:

"A method for enabling trick modes for a digitally encoded stream, the method comprising the steps of: storing the digitally encoded stream, wherein the digitally encoded stream comprises video pictures;

decoding the video pictures, starting from an entry picture, to generate one or more fully decoded pictures, wherein the entry picture is a non-intra-coded picture; and  
displaying at least one of the fully decoded pictures;  
and  
wherein the digitally encoded stream is a progressive refresh stream and the entry picture starts a progressive refresh pattern."

VIII. Claim 1 of the first auxiliary request has the following wording:

"A method for enabling trick modes for a digitally encoded stream, the method comprising the steps of:  
storing the digitally encoded stream;  
wherein the digitally encoded stream comprises video pictures;  
wherein the digitally encoded stream is a progressive refresh stream and an entry picture starts a progressive refresh pattern;  
wherein the entry picture is a non-intra-coded picture;  
decoding the video pictures to generate one or more fully decoded pictures;  
wherein the decoding starts from the entry picture and continues with decoding successive predicted pictures of the progressive refresh pattern until at least one picture of the progressive refresh pattern is fully decoded; and  
displaying at least one of the fully decoded pictures."

IX. Claim 1 of the second auxiliary request reads as follows (amendments with respect to claim 1 of the main request being underlined):

"A method for enabling trick modes for a digitally encoded stream, the method comprising the steps of: storing the digitally encoded stream, wherein the digitally encoded stream comprises video pictures; scanning through the digitally encoded stream and searching for picture start codes and/or slice start codes to identify entry pictures in the stream; decoding the video pictures, starting from an entry picture of the identified entry pictures, to generate one or more fully decoded pictures, wherein the entry picture is a non-intra-coded picture; and displaying at least one of the fully decoded pictures; and wherein the digitally encoded stream is a progressive refresh stream and the entry picture starts a progressive refresh pattern."

- X. Claim 1 of the third auxiliary request has the following wording:

"A method for enabling trick modes for a digitally encoded stream, the method comprising the steps of: storing the digitally encoded stream, wherein the digitally encoded stream comprises video pictures; scanning through the digitally encoded stream and searching for picture start codes and/or slice start codes to identify entry pictures in the stream, wherein the identified entry pictures are non-intra-coded pictures; recording locations of the identified entry pictures; decoding a first subset of the video pictures of the digitally encoded stream, starting from an entry picture of the identified entry pictures, to generate a fully decoded picture; displaying the fully decoded picture;

skipping a second subset of the video pictures of the digitally encoded stream;  
decoding a third subset of the video pictures of the digitally encoded stream, starting from a further entry picture of the identified entry pictures, to generate a further fully decoded picture; and  
displaying the further fully decoded picture;  
wherein the digitally encoded stream is a progressive refresh stream and each entry picture starts a progressive refresh pattern."

XI. Claim 1 of the fourth auxiliary request reads as follows:

"A method for enabling trick modes for a digitally encoded stream, the method comprising the steps of:  
storing the digitally encoded stream, wherein the digitally encoded stream comprises video pictures;  
scanning through a first portion of the digitally encoded stream and searching for picture start codes and/or slice start codes to identify entry pictures in the stream, wherein the identified entry pictures are non-intra-coded pictures;  
decoding video pictures of the first portion of the digitally encoded stream, starting from an entry picture of the identified entry pictures, to generate at least one fully decoded picture;  
displaying at least one of the at least one fully decoded picture;  
skipping a second portion of the digitally encoded stream;  
scanning through a third portion of the digitally encoded stream and searching for picture start codes and/or slice start codes to identify further entry pictures in the stream;



decoding video pictures of the third portion of the digitally encoded stream, starting from an entry picture of the identified further entry pictures, to generate at least one further fully decoded picture; and displaying at least one of the at least one further fully decoded picture; wherein the digitally encoded stream is a progressive refresh stream and each entry picture starts a progressive refresh pattern."

XII. In the decision under appeal, the examining division held that the subject-matter of claim 1 of the then second (now third) auxiliary request differed from D2 by the following features:

- (i) during scanning, picture start codes and/or slice start codes were searched to identify entry pictures;
- (ii) the identified entry pictures were non-intra-coded pictures;
- (iii) locations of the identified entry pictures were recorded; and
- (iv) the digitally encoded stream was a progressive refresh stream and each entry picture started a progressive refresh pattern.

An MPEG-2 stream might or might not include I-pictures on a routine basis. In the latter case, it was expected that progressive refresh would be used instead of I-pictures.

The question thus naturally arose as to how the skilled person would adapt the teachings of D2 (concerning trick modes) to a progressive refresh stream comprising no (regular) I-pictures but featuring a regular pattern.

In the examining division's view, features (ii) and (iv) derived directly from this thought, whereas feature (i) was shown in D1 as a circuit 10, comprising "a syntax parser circuit 12" and "an intra-coded video data identification, selection and processing circuit 14", which "is suitable for receiving an encoded video stream [and for] identifying intra-coded data".

Feature (iii) was considered as an obvious possibility when scanning a data stream to identify "entry pictures". The skilled person would have had to choose between pre-scanning the data stream and recording the identified locations (which ensured faster processing during trick play modes at the cost of memory space), and on-the-fly scanning and identifying (slower but no storage requirement). Both embodiments (with or without an "index table") were equally discussed in the description of the present application.

The objection for lack of inventive step applied likewise to the subject-matter of claim 1 of the then third auxiliary request because the difference merely boiled down to "skipping a second portion of the digitally encoded stream" (see decision under appeal, Reasons, points 3.2 and 4.2 to 5.2).

XIII. As far as they are relevant for the present decision the appellant's arguments can be summarised as follows.

D2 did not refer to progressive refresh streams and was therefore not relevant for evaluating the inventiveness of the subject-matter of independent claim 1 of all requests. In particular, D2 did not address the problem of the lack of I-pictures within the digitally encoded stream when performing trick play. It could not be considered as the closest prior art because D1 had more features in common with claim 1 and referred to progressive refresh streams (see statement of grounds of appeal, pages 8 and 9, and letter dated 16 October 2018, pages 7 and 8).

If D2 were nevertheless regarded as the closest prior art, the technical problem was how to use trick play with digitally encoded data that had a progressive refresh pattern. It was not contested that progressive refresh streams were known at the priority date of the application, but nothing in D2 hinted at how to implement trick play on such data. Starting from D2, the skilled person would have expected I-pictures as a starting point for decoding or would have used only I-coded macro-blocks, as in D1, to combine them to patchwork pictures.

Regarding claim 1 of the first auxiliary request, the appellant argued that the wording "successive predicted pictures" implied that starting from an entry picture, each and every picture was decoded. This was not the same as in D2, where only P-pictures were decoded (see figures 1B and 8A).

Claim 1 of the second auxiliary request additionally specified that picture start codes and/or slice start codes were searched to identify entry pictures. This feature implied that the decoding for trick play modes could be accelerated because the picture start codes

and/or slice start codes had already been identified in the scanning step. Entry pictures could therefore be easily located during trick play.

The initial scanning for and recording of locations of identified entry pictures were explicitly specified in claim 1 of the third auxiliary request. In addition, the claim specified details of the trick play operation. Claim 1 of the fourth auxiliary request contained even more details of the trick play operation.

### **Reasons for the Decision**

1. The appeal is admissible.

#### *The invention*

2. The application refers to a system and a method for implementing "trick modes" such as fast forward or reverse play on an MPEG stream. In digital cable systems the video format may not be conducive to enabling trick modes with adequate picture quality if it does not have a substantial number of I-pictures that can serve as entry points for decoding. The application addresses the problem of how to perform trick modes with a progressive refresh stream containing no I-pictures altogether.

The solution presented in the present application comprises decoding the video pictures of the progressive refresh stream, starting from an entry picture (which is a non-intra-coded picture), to generate one or more fully decoded pictures. In an exemplary embodiment, a picture starting with an I-

slice in its top rows might be referred to as an entry picture (see page 1, lines 3 to 6; page 2, lines 1 to 11, and page 11, lines 5 to 11).

*Main request*

3. In application of the "problem and solution approach" for the assessment of inventive step (see Case Law of the Boards of Appeal of the European Patent Office, 8th edition 2016, I.D.2), the board considers document D2 as the closest prior art for the subject-matter of claim 1.
  - 3.1 D2 discloses a method for enabling trick modes for a digitally encoded stream (see page 1, line 7 to page 2, line 14, and page 5, lines 13 to 20), the method comprising the steps of:

storing the digitally encoded stream, wherein the digitally encoded stream comprises video pictures (figure 4: 14 and page 7, line 35 to page 8, line 3);  
decoding the video pictures to generate one or more fully decoded pictures (figure 4: 530 and page 9, lines 16 to 29)  
and displaying at least one of the fully decoded pictures (see the "display sequence" in figures 1B and 8A).
  - 3.2 D2 fails to disclose the features of the method of claim 1, according to which the digitally encoded stream is a progressive refresh stream, and that the decoding starts from an entry picture which is a non-intra-coded picture and which starts a progressive refresh pattern. Instead, decoding in D2 starts from an I-picture.

3.3 The distinguishing features have the technical effect of adapting the teaching of D2 concerning trick play to a progressive refresh stream.

3.4 Hence, it is the board's view that the objective technical problem would have been how to implement trick play with a digital video stream having a progressive refresh pattern.

3.5 The board agrees with the finding in the decision under appeal (see point XII above) that a forward decoding and playback of a progressive refresh stream was known at the priority date of the present application. This was also not disputed by the appellant. The feature that entry pictures are non-intra-coded pictures which start a progressive refresh pattern is a definition of an entry picture that is consistent with the progressive refresh mode allowed within MPEG-2 and, hence, a fact that the skilled person has to know and take into account for implementation of forward decoding and playback.

The board also agrees with the finding in the contested decision that the use of entry pictures to start decoding for trick modes derives directly from the task of adapting the teaching of D2 to a progressive refresh stream. Similar to the way a group of pictures in D2 can only be decoded starting with an I-picture, entry pictures are needed to start decoding in progressive refresh streams (see D2, page 1, lines 33 to 35, and present application, page 11, lines 15 to 20).

3.6 The appellant's arguments did not convince the board.

3.6.1 The appellant argued that D2 did not refer to progressive refresh streams and was therefore not

relevant for evaluating the inventiveness of the subject-matter of independent claim 1. In particular, D2 did not address the problem of the lack of I-pictures within the digitally encoded stream when performing trick play. It could not be considered as the closest prior art because D1 had more features in common with claim 1 and referred to progressive refresh streams (see statement of grounds of appeal, pages 8 and 9, and letter dated 16 October 2018, pages 7 and 8).

- 3.6.2 It is correct that document D1 discloses a method for enabling trick modes for a digitally encoded stream. It also discloses storing the digitally encoded stream comprising video pictures and decoding the video pictures to generate one or more fully decoded pictures for display. The method of D1 is carried out on a progressive refresh stream.

However, this apparent similarity between the technical features of claim 1 and the disclosed method of D1 is not sufficient to conclude that document D1 must be considered as the closest prior art. The closest prior art is the document most suitable for the purpose claimed by the invention, and not that superficially showing structural similarities with the solution as claimed (see decision T 506/95, Reasons, point 4.1).

- 3.6.3 In general, and according to established jurisprudence of the boards of appeal, the closest prior art for assessing inventive step is normally a prior-art document disclosing subject-matter conceived for the same purpose or aiming at the same objective as the claimed invention and having the most relevant technical features in common, i.e. requiring the minimum of structural modification. A further criterion

for the selection of the most promising starting point is the similarity of the technical problem. The boards have consistently held that, where more than one document is cited as the closest prior art, the one which must be deemed the closest is that which provides the skilled person with the most promising springboard to the invention, i.e. the one starting from which the subject-matter of the invention is rendered most obvious (see Case Law of the Boards of Appeal of the European Patent Office, 8th edition, 2016, I.D.3.1 and I.D.3.4).

- 3.6.4 As correctly analysed by the appellant, D1 "describes methods and an apparatus for extracting data from a video bit stream including a plurality of inter-coded video frames and for arranging the data to form fully intra-coded frames which are suitable for use as trick play video frames. These composite fully intra-coded frames can then be recorded on a tape and later read back during VTR trick play operation to provide data sufficient to produce recognizable images or portions of images during trick play operation" (see statement of grounds, page 6, penultimate paragraph).
- 3.6.5 In contrast, the present invention and D2 disclose decoding "on the fly" of stored MPEG streams for trick play (see page 7, lines 12 to 16 of the application, and page 1, lines 2 to 5; page 8, line 34 to page 9, line 8 together with figure 4 of D2). Hence, the disclosure of document D1 and that of the present application differ in essential aspects. In contrast, due to the similarity of its purpose (performing decoding for trick play "on the fly" on a stored MPEG stream), D2 provides the most promising springboard to the invention.



- 3.6.6 Furthermore, the appellant argued that starting from D2, the objective technical problem was how to use trick play with digitally encoded data that has a progressive refresh pattern. The appellant also argued that nothing in D2 hinted at how to implement trick play on a progressive refresh stream. Starting from D2, the skilled person would have either expected I-pictures as a starting point for decoding or used only I-coded macro-blocks, as in D1, to combine them to patchwork pictures.
- 3.6.7 The board considers the appellant's formulation of the objective technical problem to be essentially identical to the one established by the board (see point 3.4 above), with the difference that the application concerns the implementation of trick play and not its use (see present application, page 1, lines 3 to 6). The board also disagrees that the skilled person needed a prompt in D2 to implement trick play on a progressive refresh stream. As argued under point 3.5 above, progressive refresh streams were known to the skilled person before the relevant date and thus the skilled person would have naturally been faced with the problem of how to implement trick play modes on such streams.
- 3.7 As a result, the subject-matter of claim 1 would have been obvious to a person skilled in the art in view of document D2 and the common general knowledge of the skilled person; it thus lacks inventive step (Article 56 EPC 1973).

*First auxiliary request*

4. Besides some rearrangement of the features, claim 1 according to the first auxiliary request essentially differs from claim 1 of the main request by specifying

that "decoding ... continues with decoding successive predicted pictures of the progressive refresh pattern until at least one picture of the progressive refresh pattern is fully decoded".

- 4.1 D2 (see figure 8A) discloses that starting from an I-picture (for example I(13)), decoding continues with successive predicted pictures (P(16), P(19)) until at least one picture of the MPEG stream is fully decoded (see display sequence).

This decoding process corresponds to the one of claim 1 except that it is applied to the MPEG stream of D2 and not to a progressive refresh pattern.

- 4.2 Additional differences with respect to claim 1 of the main request are therefore caused by the application to a different type of stream, which was already identified as the essential difference between the subject-matter of claim 1 and that of document D2, see point 3.2 above. Hence, the reasoning regarding inventive step of the subject-matter of claim 1 of the first auxiliary request corresponds to that of the main request.

- 4.3 The appellant argued that the wording "successive predicted pictures" implied that starting from an entry picture, each and every picture was decoded, and not only I- and P-pictures as in document D2.

This interpretation is not in line with the method disclosed in the application (see page 13, line 23 to page 14, line 7) which also envisages the skipping of B-pictures. More importantly, the wording of claim 1 is not limited in that sense.

- 4.4 Hence, the subject-matter of claim 1 of the first auxiliary request lacks inventive step in view of document D2 and the common general knowledge (Article 56 EPC 1973).

*Second to fourth auxiliary requests*

5. Claim 1 of the second auxiliary request essentially differs from claim 1 of the main request in that it specifies an additional step of "scanning through the digitally encoded stream and searching for picture start codes and/or slice start codes to identify entry pictures in the stream".
- 5.1 Syntax parsing for picture/slice start codes is considered to be well known in the technical field and has to be carried out in order to perform trick play on a digital MPEG stream, such as disclosed in D2 (see also decision under appeal, Reasons, section 3).
- 5.2 The appellant argued that this feature implied that the decoding for trick play modes could be accelerated because picture start codes and/or slice start codes were identified in a scanning step before the decoding procedure. Entry pictures could therefore be quickly located during trick play.
- 5.3 The board is not convinced that claim 1 requires the scanning operation to be carried out separately and before the decoding procedure.

Nevertheless, even if the appellant's interpretation were considered to be supported by features of claim 1, it is considered as an obvious option for the skilled person who may choose to use an "index table" depending on its preference in a particular application. The

advantages and disadvantages of this measure regarding the speed of processing and storage requirements are well known in the technical field (see also decision under appeal, Reasons, point 4.6).

- 5.4 Hence, the subject-matter of claim 1 of the second auxiliary request lacks inventive step in view of document D2 and the common general knowledge of the skilled person (Article 56 EPC 1973).
6. Claim 1 of the third auxiliary request also comprises the scanning step "for picture start codes and/or slice start codes" of claim 1 of the second auxiliary request. In addition, the claim specifies that locations of the identified entry pictures are recorded. The claim further specifies details of the trick play operation such as "skipping a second subset of the video pictures ...", "decoding a third subset of the video pictures of the digitally encoded stream ..." and "displaying the further fully decoded picture".
- 6.1 The board acknowledges that, due to the separate recording step, claim 1 makes it clear that the scanning step is carried out independently and prior to the decoding steps. Nevertheless, the reasoning under point 5.3, second paragraph, applies. In addition, document D2 discloses skipping, decoding and displaying steps and subsets of pictures corresponding to the subsets and steps of claim 1 of the third auxiliary request (see figure 8A: J1, J2, J3, Jn, and "display sequence").
- 6.2 Hence, the subject-matter of claim 1 of the third auxiliary request lacks inventive step in view of document D2 and the common general knowledge of the skilled person (Article 56 EPC 1973).

7. Claim 1 of the fourth auxiliary request differs essentially from claim 1 of the third auxiliary request in that it requires "scanning through a third portion of the digitally encoded stream and searching for picture start codes and/or slice start codes to identify further entry pictures in the stream". Moreover, it does not comprise the step of "recording locations of the identified entry pictures" of the second auxiliary request.

7.1 The scanning and decoding of the third portion corresponds to the step of locating and decoding picture I(1) in document D2, figure 8A, see also page 21, lines 32 to 36. Whether the scanning of the first portion and the third portion to identify entry pictures of the stream was effected separately for different portions of the digitally encoded stream or, as in claim 1 of the third auxiliary request, prior to a recording operation, is a matter of design choice that the skilled person would readily choose according to the circumstances (see also point 5.3, second paragraph).

7.2 Hence, the subject-matter of claim 1 of the fourth auxiliary request also lacks inventive step in view of document D2 and the common general knowledge of the skilled person (Article 56 EPC 1973).

### *Conclusion*

8. It follows from the above that none of the appellant's requests are allowable and that therefore the present appeal is to be dismissed.

**Order**

**For these reasons it is decided that:**

The appeal is dismissed.

The Registrar:

The Chairman:



K. Boelicke

C. Kunzelmann

Decision electronically authenticated