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**Datasheet for the decision  
of 20 November 2019**

**Case Number:** T 0403/14 - 3.5.04  
**Application Number:** 11181543.7  
**Publication Number:** 2398228  
**IPC:** H04N5/232, H04N5/225,  
H04N101/00, H04N5/783, H04N7/01  
**Language of the proceedings:** EN

**Title of invention:**

High speed image capturing apparatus and method

**Applicant:**

Sony Corporation

**Headword:**

**Relevant legal provisions:**

EPC 1973 Art. 84, 56  
RPBA Art. 12(4), 13(1)

**Keyword:**

Claims - clarity (no)  
Amended claims submitted with the statement of grounds of  
appeal - admitted (no)  
Inventive step (no)

**Decisions cited:**

T 1212/08, T 1108/10, T 0892/11

**Catchword:**



**Beschwerdekammern**  
**Boards of Appeal**  
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Case Number: T 0403/14 - 3.5.04

**D E C I S I O N**  
**of Technical Board of Appeal 3.5.04**  
**of 20 November 2019**

**Appellant:** Sony Corporation  
(Applicant) 1-7-1 Konan  
Minato-ku  
Tokyo 108-0075 (JP)

**Representative:** D Young & Co LLP  
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**Decision under appeal:** **Decision of the Examining Division of the  
European Patent Office posted on 16 October 2013  
refusing European patent application  
No. 11181543.7 pursuant to Article 97(2) EPC.**

**Composition of the Board:**

**Chairman** B. Müller  
**Members:** M. Paci  
A. Dumont

## **Summary of Facts and Submissions**

- I. The appeal is against the decision of the examining division refusing European patent application No. 11 181 543.7, published as European patent application EP 2398228 A1.
- II. The documents cited in the decision under appeal included the following:
- D1: WO 02/21828 A2  
D4: US 2006/0013507 A1  
D5: GB 2240446 A.
- III. The decision under appeal was based on the grounds that claims 1 and 3 of the then main, first and second auxiliary requests were unclear (Article 84 EPC) and their subject-matter did not involve an inventive step (Article 56 EPC) in view of prior-art document D1 and common general knowledge, with prior-art documents D4 and D5 cited as evidence of the common general knowledge.
- IV. With the statement of grounds of appeal, the appellant filed claims according to a main request and a first auxiliary request, replacing all previous claims on file.
- V. The board issued a summons to oral proceedings, together with a communication under Article 15(1) of the Rules of Procedure of the Boards of Appeal (RPBA, OJ EPO 2007, 536) in which it gave a preliminary opinion which may be summarised as follows:
- claims 1 and 3 according to the main request did not meet the requirement of clarity and conciseness of Article 84 EPC 1973;

- the subject-matter of claims 1 to 5 according to the main request did not involve an inventive step (Article 56 EPC 1973) in view of prior-art document D1 and common general knowledge; and
- the board was inclined, pursuant to Article 12(4) RPBA (Rules of Procedure of the Boards of Appeal, OJ EPO 2007, 536), not to admit the first auxiliary request into the proceedings.

VI. With a letter dated 10 October 2019, the appellant re-filed the claims according to the main and first auxiliary requests and filed amended claims according to a second auxiliary request.

VII. The board held oral proceedings on 20 November 2019.

The appellant's final requests were that the decision under appeal be set aside and a European patent be granted on the basis of the main request or the first or second auxiliary request, all filed with a letter dated 10 October 2019.

At the end of the oral proceedings, the chairman announced the board's decision.

VIII. Claim 1 according to the appellant's **main request** reads as follows:

"An image capturing apparatus, comprising:

an image sensor (101) for outputting first raw data having a first frame rate;

conversion means (201) for converting the first raw data into second raw data having a second frame rate which is lower than the first frame rate;

camera signal processing means (202, 203) for performing a camera signal processing operation on the

second raw data so as to output an image signal on which the camera signal processing operation has been performed, the camera signal processing means comprising: a pre-processing circuit (202) comprising a shading correction circuit (231); and a camera signal processing circuit (203) connected to receive an image signal output from the pre-processing circuit (202) and comprising in sequence a simultaneously forming circuit (241), a white balance correction circuit (242), an aperture correction circuit (243), a gamma correction circuit (244) and a YC generation circuit (245);

recording device control means (210) for controlling recording of the first raw data onto a recording device (111) and for controlling reading of the first raw data from the recording device; and

control means (213) for controlling at least the recording device control means and the camera signal processing means so as to record the first raw data to the recording device without processing by the camera signal processing means,

in which:

the conversion means is operable to convert the first raw data into the second frame rate and the camera signal processing means is operable to process the second raw data at the second frame rate so as to output processed second raw data for display when the first raw data is to be recorded; and

the recording device control means is operable to cause the first raw data recorded on the recording device to be read at the second frame rate so as to output third raw data and the camera signal processing means is operable to process the third raw data at the second frame rate so as to output processed third raw data for display when the first raw data is to be read."

IX. Claim 1 according to the appellant's **first auxiliary request** reads as follows:

"An image capturing apparatus, comprising:

an image sensor (101) for outputting first raw data having a first frame rate;

conversion means (201) for converting the first raw data into second raw data having a second frame rate which is lower than the first frame rate;

camera signal processing means (202, 203) for performing a camera signal processing operation on the second raw data so as to output an image signal on which the camera signal processing operation has been performed, the camera signal processing means comprising a pre-processing circuit (202) comprising a shading correction circuit (231); and a camera signal processing circuit (203) connected to receive an image signal output from the pre-processing circuit (202) and comprising in sequence a simultaneously forming circuit (241), a white balance correction circuit (243), an aperture correction circuit (243), a gamma correction circuit (244) and a YC generation circuit (245);

memory control means (501) for controlling recording of the first raw data onto a memory (502) and for controlling reading of the first raw data from the recording device; and

control means (213) for controlling at least the recording device control means and the camera signal processing means so as to record the first raw data to the recording device without processing by the camera signal processing means,

in which:

the conversion means is operable to convert the first raw data into the second frame rate and output the second raw data at the second frame rate to a simple pre-processing circuit (401) and a simple camera

signal processing circuit (402) that are simply structured in comparison with the pre-processing circuit and the camera signal processing circuit and configured to receive the second raw data from the conversion means at the second frame rate and to output an image signal at the second frame rate for display by a display processing circuit (208) of the apparatus, the simple camera processing circuit configured to output said image signal to a first switch (SW3);

the memory control means is operable to read the raw data from the memory as third raw data at the second frame rate the camera signal processing means is operable to process the third raw data at the second frame rate so as to output processed third raw data to a second switch (SW4);

the apparatus further comprising a recording device control means (504) operable to cause the processed third raw data to be recorded on a recording device (505) at the second frame rate when the second switch is in a recording position;

the recording device control means is operable to cause the processed third raw data recorded on the recording device to be read at the second frame rate so as to output the processed third raw data to the second switch, the second switch operable in a playback position to route the processed third raw data to the first switch, the first switch operable in a playback position to route the processed third raw data received from the second switch to the display processing circuit ;to output processed third raw data for display; and

the first switch is operable .in [sic] a recording position to route the image signal from the simple camera signal processing circuit to the display processing circuit."



- X. Claim 1 according to the appellant's **second auxiliary request** differs from claim 1 according to the appellant's **main request** by the following additional feature at the end of the claim:

" , wherein the simultaneously forming circuit is operable to interpolate lost pixels of each colour component of the second raw data."

### **Reasons for the Decision**

1. The appeal is admissible.

#### *Main request - amendments*

2. The claims of the present main request are identical to those of the second auxiliary request underlying the appealed decision, except for typographical errors relating to the punctuation which do not change the features of the claimed subject-matter (a colon was added in claim 1 and a semicolon was added before a comma and another semicolon was deleted in claim 3).

#### *Main request - clarity (Article 84 EPC 1973)*

3. The examining division held that the term "simultaneously forming circuit" used in claim 1 of the second auxiliary request underlying the decision had no clear established meaning and was therefore unclear (see point 2.3.1 of the Reasons of the appealed decision).
4. Mentioning Article 69 EPC, the appellant essentially argued that the term was clear in the light of page 24, lines 21 to 24, of the description which defined the

term as a circuit which interpolates lost pixels of each colour component.

5. The board concurs with the examining division that the term "simultaneously forming circuit" has no clear established meaning in the technical field of image processing. According to the provisions of Article 84 EPC 1973, the claims must be clear in themselves, which is not the case for claim 1 of the main request because of this unclear term.

6. Conclusion on the main request

Since claim 1 of the main request does not meet the requirement of clarity of Article 84 EPC 1973, the main request is not allowable.

*First auxiliary request - admittance (Article 12(4) RPBA)*

7. Pursuant to Article 12(4) RPBA (Rules of Procedure of the Boards of Appeal, OJ EPO 2007, 536), the board has the power to hold inadmissible a request which could have been presented in the first-instance proceedings but was not (see Case Law of the Boards of Appeal of the EPO, 8th edition 2016, IV.E.4.3.1 in general and IV.E.4.3.3 b) for *ex parte* appeal proceedings).
8. Claim 1 according to the first auxiliary request has been amended with respect to claim 1 of the main request by adding several features taken from the description and specific to the fourth embodiment shown in figures 13 to 15.
9. The appellant has not disputed that these additional features are derived solely from the description and drawings of the application as filed. The appellant

confirmed that they had no equivalent in the original claims and were not included in any set of claims submitted before the examining division. The board thus sees no reason to assume that these features have been the subject of a search.

10. If the board were to admit the first auxiliary request into the proceedings, it would be forced either (1) to examine and decide on subject-matter which has probably not been searched or (2) to remit the case to the examining division in order to enable a search to be performed. The board concurs with the view taken in similar situations by other boards of appeal in decisions T 1212/08 (see section 4 of the Reasons), T 1108/10 (see section 3.2 of the Reasons) and T 892/11 (see section 2 of the Reasons) (see also Case Law of the Boards of Appeal of the European Patent Office, 8th edition 2016, IV.E.4.3.3.b) that neither of these procedural options is appropriate and acceptable. If the appellant intended to seek protection for the subject-matter of claim 1 of the present first auxiliary request, it should have presented this request before the examining division, for instance as a further auxiliary request. The appellant had several opportunities to do so because the subject-matter of claim 1 was already objected to - for lack of novelty or lack of inventive step over D1 - in several communications of the examining division.

11. The appellant's arguments may be summarised as follows:

The examining division introduced new documents and arguments shortly before the oral proceedings took place. The period of time in question was far short of the period that befits a communication from the examining division raising matters of substance (four

months) - EPO Guidelines, E, VIII, 1.2 (version of November 2018).

The applicant therefore had very little opportunity to fully consider the examining division's position and to respond accordingly.

Moreover, it was "clearly not feasible for the applicant to pursue every feasible amendment at oral proceedings". The examining division proceeded to oral proceedings as soon as was legally permitted, thereby limiting the applicant's opportunity to pursue different arguments and amendments. Accordingly, it was not accurate to say that the applicant could have presented such an amendment at first instance.

12. The board does not find these arguments persuasive for the following reasons:
  - 12.1 On four different occasions, the appellant filed one or more sets of amended claims in the first-instance proceedings:
    - with a letter dated 13 June 2012 filed in reply to the extended European search report (Rule 62 EPC);
    - with a letter dated 3 September 2012 filed in reply to the examining division's first communication pursuant to Article 94(3) EPC;
    - with a letter dated 25 April 2013 filed in reply to the examining division's communication annexed to the summons to oral proceedings; and
    - during the oral proceedings held on 25 September 2013.

Prior to each of these four occasions, the examining division had objected that the subject-matter of

claim 1 lacked novelty over D1 or did not involve an inventive step when starting from D1.

The board thus notes that the applicant had many occasions to file amended claims in the first-instance proceedings.

- 12.2 In a brief communication dispatched on 1 July 2013, i.e. **nearly three months** before the date of the oral proceedings held on 25 September 2013, the examining division introduced prior-art documents D4 and D5 as evidence of common general knowledge.

Hence, contrary to the appellant's argument, the applicant had sufficient time after reception of the brief communication to study prior-art documents D4 and D5 and to file amended claims before or during the oral proceedings.

13. For the above reasons, the board concludes that, if the applicant considered it necessary to seek protection for the subject-matter of claim 1 of the present first auxiliary request in order to patentably distinguish its claimed invention from D1, it should have filed this request before the examining division, for instance, as a further auxiliary request, and it had several occasions to do so.

Already for the above reasons, the board considers that the first auxiliary request should not be admitted into the proceedings, pursuant to Article 12(4) RPBA.

Moreover, the fact that the subject-matter of claim 1 of the present first auxiliary request was likely not searched (see points 9 and 10 *supra*) provides an

additional reason why the board should not admit this request into the appeal proceedings.

14. For the above reasons, the board has decided, pursuant to Article 12(4) RPBA, not to admit the appellant's first auxiliary request into the proceedings.

*Second auxiliary request - amendments*

15. Compared to claim 1 of the main request, claim 1 of the second auxiliary request comprises the additional feature that the simultaneously forming circuit is operable to interpolate lost pixels of each colour component of the second raw data.

*Second auxiliary request - admittance (Article 13(1) RPBA)*

16. The board is satisfied that the above amendment to claim 1 overcomes the objection of lack of clarity (Article 84 EPC 1973) raised against claim 1 of the main request (see points 3 to 5 *supra*), by specifying the function of the "simultaneously forming circuit" in the claim.
17. The board also notes that the appellant did not dispute that the thus clarified "simultaneously forming circuit" was a standard block commonly used in camera signal processing. An additional search for this feature was therefore not necessary.
18. Under those circumstances, the board was of the view during the oral proceedings that this amendment did not add significant complexity to the case and that this request could be substantively examined during the oral proceedings without negatively affecting the procedural economy. Hence the board decided to exercise its

discretion under Article 13(1) RPBA in admitting the second auxiliary request into the proceedings.

*Second auxiliary request - inventive step (Article 56 EPC 1973)*

19. Closest prior art

The appellant has not disputed that document D1 represents the closest prior art for the subject-matter of claim 1.

20. Disclosure of D1

D1 discloses a camera (figure 1) which captures images at a high frame rate ( $f_{HS}$ ). The captured images are written at the high frame rate in a memory (5) from which they can be read out at the standard TV-video frame rate ( $f_V$ ) in order to create a slow motion effect on a standard TV display (see page 10, lines 21 to 28). The images captured at the high frame rate ( $f_{HS}$ ) are also output to a rate converter (4) which converts them from the high frame rate ( $f_{HS}$ ) to the standard TV-video frame rate ( $f_V$ ) (see from page 9, line 7, to page 10, line 19). The thus obtained two streams of images at the regular rate, i.e. from the rate converter (4) and from the memory (5), are supplied to respective processing circuits 10 and 14 where they are processed to be converted into an analog or digital standard TV format (see page 11, lines 11 to 20). Moreover, these two streams are also supplied to a switch (16) which selectively outputs one of them to processing circuit 12 where it is processed to be converted into a standard analog or digital TV format (see page 11, lines 20 to 22).

21. Distinguishing features

21.1 The board is of the view that, for the reasons given under point 2.1.2 of the reasons for the decision under appeal, the camera of D1 discloses all the features of the image capturing apparatus of claim 1, except for the following distinguishing features:

"the camera signal processing means comprising: a pre-processing circuit (202) comprising a shading correction circuit (231); and a camera signal processing circuit (203) connected to receive an image signal output from the pre-processing circuit (202) and comprising in sequence a simultaneously forming circuit (241), a white balance correction circuit (242), an aperture correction circuit (243), a gamma correction circuit (244) and a YC generation circuit (245)";

and

"wherein the simultaneously forming circuit is operable to interpolate lost pixels of each colour component of the second raw data."

21.2 The appellant argued that the apparatus of claim 1 differed from the apparatus of D1 not only by the above distinguishing features, but also by the following features (A) and (B):

Feature (A):

All references to "recording device" in claim 1.

Feature (B):

"the recording device control means is operable to cause the first raw data recorded on the recording



device to be read at the second frame rate so as to output third raw data and the camera signal processing means is operable to process the third raw data at the second frame rate so as to output processed third raw data for display when the first raw data is to be read".

Re feature (A), the appellant argued that the memory (5) of D1 was not a "recording device" in the meaning of claim 1 because the "recording device 111" in figure 1 of the application was not a semiconductor memory.

Re feature (B), the appellant argued that according to page 11, lines 17 to 22, of D1, the raw data stored in memory 5 was not read out at the standard TV-video frame rate ( $f_V$ ) ("the second frame rate" in claim 1), but at the higher frame rate ( $f_{HS}$ ) ("the first frame rate" in claim 1).

21.3 The board disagrees with the appellant for the following reasons:

21.3.1 Re feature (A)

On page 22, lines 17 to 19, of the description of the present application, the following is stated: "As the recording device 111, a magnetic tape, a semiconductor memory such as a flash memory, a hard disk, or the like can be used". Hence, contrary to the appellant's argument, recording device 111 may be a semiconductor memory.

Since D1 states that memory 5 may be a semiconductor memory (see page 11, lines 1 and 2), the "recording

device" of claim 1 is not distinguished from the memory (5) of D1.

### 21.3.2 Re feature (B)

The passage on page 11, lines 17 to 22, of D1, cited by the appellant reads as follows:

"Am Ausgang 11 steht die Standard-Videosequenz, am Ausgang 15 die High-Speed-Sequenz und am Ausgang 13 wahlweise die Standard-Video- oder High-Speed-Sequenz zur Verfügung. Durch einen Umschalter 16 erfolgt vor dem Ausgang 13 die Auswahl zwischen Standard-Video- oder High-Speed-Sequenz."

The appellant inferred from the passage that the data read out from memory 5 is not necessarily at the standard TV-video frame rate ( $f_V$ ), but must at least be available for processing at the higher frame rate ( $f_{HS}$ ), as an option ("wahlweise").

In the board's view, this interpretation of D1 is incorrect. Indeed, in view of the whole disclosure of D1, the expression "High-Speed-Sequenz" in the cited passage must be construed as a sequence of images captured and stored in memory 5 at the higher frame rate ( $f_{HS}$ ), but **read out** from memory 5 in slow motion ("in Zeitlupe") **at the standard TV-video frame rate ( $f_V$ )**. This is made clear by the following passages of D1:

- According to page 10, lines 21 to 28, and original claims 5 and 6, the sequence of images stored in memory 5 at the higher frame rate ( $f_{HS}$ ) is read out from memory 5 **in slow motion** ("in Zeitlupe").
- According to page 11, lines 11 to 16: the sequence of images read out from memory 5 is input to both

units 12 and 14 which convert it to a "Standardformat für TV-Video" by performing a digital-to-analog conversion and by adding the necessary synchronisation signals.

As a result, it is clear that the sequence of images read out from memory 5 is **at the standard TV-video frame rate ( $f_V$ )** but represents a sequence of images captured and stored in memory 5 at the higher frame rate ( $f_{HS}$ ) and read out from memory 5 **in slow motion** ("in Zeitlupe") **at the standard TV-video frame rate ( $f_V$ )**.

- 22. Technical effect and objective technical problem
- 22.1 The appellant argued that the technical effect achieved by the distinguishing features (i.e. over D1) was "reduced power consumption and/or reduced circuit area" because the processing was performed at the lower "second frame rate" (the standard TV-video frame rate ( $f_V$ ) in D1) (see point 7 on page 3 of the appellant's letter of 10 October 2019).
- 22.2 The board disagrees with the appellant. The technical effect formulated by the appellant may be the technical effect achieved **over the prior art shown in figure 1 of the application**, but it is **not** the technical effect achieved **over the closest prior art D1**, i.e. achieved by the distinguishing features listed in point 21.1 above, because in the camera of D1, like in claim 1, the signal processing is performed (in circuits 10, 12 and/or 14) at the standard TV-video frame rate, not at the higher frame rate. The technical effect over D1 can thus only be the technical effect achieved by the specific circuits used in the pre-processing circuit (202) and the camera signal processing circuit (203) of

claim 1, namely, in sequence, the shading correction circuit (231), the simultaneously forming circuit (241), the white balance correction circuit (242), the aperture correction circuit (243), the gamma correction circuit (244) and the YC generation circuit (245).

For the above reasons, the board considers the technical effect over D1 to be the technical effect achieved by this sequence of processing circuits (231 and 241 to 245) and the objective technical problem to be how to achieve this effect.

23. Obviousness

23.1 The examining division essentially argued that the skilled person would have arrived at the apparatus of claim 1 without inventive step when starting from the camera of D1 because:

- (a) the circuits 231 and 241 to 245 were standard blocks commonly used in camera signal processing and their relative ordering was insignificant;
- (b) the skilled person had only two options as to where to place these circuits, i.e. either before or after the high-to-regular frame conversion means; and
- (c) it would have been obvious for the skilled person to choose to place these circuits after the high-to-regular frame rate conversion means in order to reduce power consumption by processing signals at a lower frame rate.

23.2 The appellant essentially argued that there was no suggestion in D1 (nor in D4 and D5 cited as evidence of common general knowledge) to place the particular sequence of circuits 231 and 241 to 245 in the low frequency domain instead of the high frequency domain.

23.3 The board concurs with the examining division that the skilled person would have arrived at the distinguishing features of claim 1 without an inventive step for the following reasons:

In D1, the signal processing for converting the sequence of images read out from memory 5 into a standard TV signal is performed in one or both of circuits 12 and 14. This signal processing is thus performed at the standard TV-video frame rate ( $f_V$ ), not at the higher frame rate ( $f_{HS}$ ). Hence, contrary to what the appellant argued, the skilled person would not have had to move the signal processing from the high frequency domain to the low frequency domain; it was already in the low frequency domain in D1.

Moreover, the higher frame rate ( $f_{HS}$ ) is much higher than the regular rate ( $f_V$ ) **by a factor of more than 20** in D1 (see the paragraph bridging pages 5 and 6). It would thus have made no technical sense to perform the signal processing at the higher frame rate because it would have been considerably more difficult and more power intensive.

As to the specific circuits 231 and 241 to 245 mentioned in claim 1, the appellant did not dispute the examining division's finding that they were standard blocks commonly used in camera signal processing. The board concurs with the examining division on this finding. The board also notes that the inner workings of these circuits are not disclosed in the application as filed because they are well-known in the art.

As to the relative order of circuits 231 and 241 to 245 in claim 1, the board concurs with the examining division that it cannot render the claimed apparatus

inventive because it is one of several possible obvious orders and does not achieve any unexpected technical effect. This is confirmed by the description of the application which states that "the arrangement order of these structural elements may be changed or a part of which may be omitted" (see page 24, lines 18 to 20).

24. Conclusion on inventive step regarding claim 1

For the above reasons, the apparatus of claim 1 does not involve an inventive step in view of prior-art document D1.

25. Conclusion on the second auxiliary request

Since the subject-matter of claim 1 of the second auxiliary request does not meet the requirement of inventive step of Article 56 EPC 1973, the second auxiliary request is not allowable.

*Conclusion*

26. Since the appellant's main and second auxiliary request are not allowable and the appellant's first auxiliary request is not admitted into the proceedings, the appeal must be dismissed.

**Order**

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

The appeal is dismissed.

The Registrar:

The Chairman:



K. Boelicke

B. Müller

Decision electronically authenticated