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Datasheet for the decision of 11 September 2014

Case Number: T 2343/09 - 3.5.07

Application Number: 08010578.6

Publication Number: 1970905

IPC: G11B7/00

Language of the proceedings: EN

Title of invention:
Optical recording medium, device and method for recording optical recording medium, and device and method for reproducing optical recorded medium

Applicant:
Sony Corporation

Headword:
Optical recording medium/SONY

Relevant legal provisions:
EPC Art. 123(2), 56

Keyword:
Amendments - added subject-matter (yes)
Late-filed request - admitted (yes)
Inventive step - (no) (all requests)

Decisions cited:

Catchword:

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Case Number: T 2343/09 - 3.5.07

D E C I S I O N
of Technical Board of Appeal 3.5.07
of 11 September 2014

Appellant: (Applicant)	Sony Corporation 7-35, Kitashinagawa 6-chome, Shinagawa-ku Tokyo 141-0001 (JP)
Representative:	Smith, Samuel Leonard J A Kemp 14 South Square Gray's Inn London WC1R 5JJ (GB)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 24 July 2009 refusing European patent application No. 08010578.6 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	R. Moufang
Members:	M. Rognoni
	P. San-Bento Furtado

Summary of Facts and Submissions

I. The applicant (appellant) appealed against the decision of the Examining Division to refuse European patent application no. 08010578.6.

II. The contested decision was based on the following prior art:

D1: JP-A-08 315 368,
D1': certified translation of JP-A-08 315 368,
D2: JP-A-04 074 317.

III. The Examining Division held, *inter alia*, that the subject-matter of claims 1 and 3 according to the main request then on file was not new with respect to document D1 and that claim 5 of the same request did not involve an inventive step with respect to documents D1 and D2, and the skilled person's general knowledge. The subject-matter of independent claims 1 and 3 of the first and second auxiliary requests was not new over document D1, whereas the subject-matter of claim 1 according to the third auxiliary request lacked an inventive step with respect to the combination of documents D1 and D2.

IV. With the statement of grounds of appeal, the appellant requested that the decision of the Examining Division be set aside and that a patent be granted on the basis of the enclosed amendments ("Main Request"), or else that the case be remitted to the department of first instance for further prosecution on the basis of the same amendments.

As pointed out by the appellant (see 3.1 of the statement of grounds of appeal), the main request was

the same as the third auxiliary request considered by the Examining Division.

V. In a communication summoning the appellant to oral proceedings, the Board raised objections under Articles 123(2) and 56 EPC. In particular, the Board noted that claim 1 of the appellant's main request appeared to extend beyond the content of the application as originally filed. Furthermore, the Board indicated that it was inclined to agree with the Examining Division that the subject-matter of claim 1 did not involve an inventive step within the meaning of Article 56 EPC.

VI. In response to the Board's communication, the appellant submitted, with letter dated 25 July 2014, some comments relating to the Board's objections against the allowability of the main request, and filed a new first auxiliary request.

VII. With letter dated 4 September 2014, the Board was informed that neither the appellant nor its representative would be attending the oral proceedings scheduled for 11 September 2014.

VIII. On 11 September 2014, oral proceedings were held in the absence of the appellant. At the end of the proceedings, the Chairman announced the Board's decision.

IX. According to its written submissions, the appellant requested that the decision under appeal be set aside and a patent be granted on the basis of the main request filed with the statement of grounds of appeal or of the first auxiliary request filed with the letter dated 25 July 2014.

X. Claim 1 according to the main request reads as follows:

"An optical recording medium (2) having tracks each of which is constructed by a plurality of pits, which are formed on the basis of sync data and first data (D2U) to be recorded, and a land between the pits, wherein

said plurality of pits which are formed on the basis of said first data (D2U) each have the same width and are deviated from the center of the track on the basis of second data (D2L), and characterised in that:

said plurality of pits which are formed on the basis of said sync data each have the same width as the pits formed on the basis of the first data and are formed centrally on said tracks to form a sync pattern."

The main request further comprises two independent claims 3 and 5 directed to a reproducing apparatus and to a recording apparatus, respectively. These claims are not relevant to the present decision.

Claim 1 according to the first auxiliary request reads as follows:

"An optical recording medium (2) having tracks each of which is constructed by a plurality of pits, which are formed on the basis of header data and first data (D2U) to be recorded, and a land between the pits, said tracks further comprising a series of frames, said frames having a head area, wherein

said plurality of pits which are formed on the basis of said first data (D2U) each have the same width and are deviated from the center of the track on the basis of second data (D2L), and characterised in that:

said plurality of pits which are formed on the basis of said header data are formed in said frame head areas, each have the same width as the pits formed on the basis of the first data and are formed centrally on said tracks."

Independent claims 3 and 5 are not relevant to the present decision.

XI. The appellant argued in writing essentially as follows.

According to claim 1 of the main request, the pits of the optical recording medium of the present invention were formed on the basis of first data and sync data, as in a conventional CD. The pits were then "deviated" (*i.e.* laterally displaced) from the centre of the track on the basis of second data. During reproduction, the reproducing apparatus caused the laser to track the pits, thereby generating a tracking error signal. The second data was reproduced by detecting the high-frequency components of the tracking error signal.

According to a further feature of claim 1, the pits representing the sync data and the pits formed on the basis of the first data had the same width. Although this feature was not explicitly stated in the application, it was certainly implicit to the skilled reader, since the entire teaching of the application related to a recording apparatus that used a single laser. It was the inevitable result of using such an apparatus that the pits on the optical medium had the same width.

Thus, no new subject-matter was introduced in the present case by adding to claim 1 the inevitable

feature of the pits having the same width (Article 123(2) EPC).

Both D1 and D2 related to the manufacture of optical discs in which pits were deviated to store second data, in addition to first data represented by the sequence of pits and lands. D2 disclosed an optical recording medium in which first and second data were encoded by a single laser, whereas D1 taught the use of two laser beams for recording the displaced pits.

D2 did not mention sync patterns or sync pits at all. Therefore, even if a skilled person had implemented the teaching of D2 on a disc using sync pits, no special consideration would have been made in connection with the sync pits. In the absence of a disclosure that some pits were not deviated, there was a direct and unambiguous disclosure that all pits were being deviated.

In D1, each laser beam had a fixed position and was not moved laterally. One laser beam was used for recording pits displaced in one direction from the track centre, whilst a second laser beam was used for recording pits displaced in the other direction. D1 taught that using two fixed laser beams provided a particular technical advantage over the use of a single laterally displaceable laser beam, namely giving more defined transitions between pits deviated in opposite directions (paragraphs [0005] and [0008] of D1). This allowed the first data to be more accurately read. Furthermore, calibration of the displacement in D1 was achieved by means of sync pits formed simultaneously by the two recording lasers. The result of operating the lasers simultaneously was that a single pit wider than the other pits was formed centrally on the track.

Claim 1 according to the main request specified that the sync pattern pits had the same width as the data pits and that the sync pits were formed centrally on the tracks. As this implied the use of a single laser, document D2 represented the closest prior art.

The novel feature of claim 1 of the main request compared to D2 was that the sync pits were not deviated in the present invention. D2 disclosed a system in which all data pits should be deviated in order to increase recording capacity. With respect to D2, the present invention solved the problem of reducing tracking errors when the values of the second data caused the displacement of the pits to be biased from the centre of the track.

The solution of arranging the pits of the sync data on the centre of the track was not obvious from D2. Firstly, there was no teaching in D2 that suggested the present problem. Secondly, there was no teaching in D2 that disclosed or suggested that the novel feature could provide a solution to this problem. The sync pattern identified frames of data by providing a unique sequence of lands and pits. This was read in the same manner as the first data, irrespective of whether or not the pits of the sync data and the first data were deviated. As there was no technical requirement for the pits of the sync data to be centred on the track, the skilled person had no reason to exclude the pits of the synchronisation pattern from being deviated to additionally store second data.

Furthermore, the novel feature that the pits of the sync data were arranged centrally was not obvious from D1, because this document did not disclose or suggest

that such feature could provide a solution to the problem of reducing tracking errors in the case that the pits of the sync data had the same width as pits of the first data.

D1 taught that the sync pits were recorded by operating both recording lasers simultaneously. Although this resulted in sync pits that were centred on the track, this was only in combination with these pits being wide and not of the same width as the pits of the first data, as required by claim 1. In fact, the skilled person was taught in D1 that a wide centred pit could be used to set the threshold, not that centred pits of normal width could correct tracking errors.

In summary, the subject-matter claim 1 of the main request involved an inventive step over the cited prior art (Article 56 EPC).

The first auxiliary request was filed in response to some added-matter objections. The same arguments given in support of the inventive step of the main request applied also to the first auxiliary request.

Decision electronically authenticated

Reasons for the Decision

1. The appeal is admissible.

2. According to the description (application as originally filed, page 2, first full paragraph), the present application relates to an optical medium, known as "ExCD" (cf. *ibid.* page 16, lines 15 to 18), which can provide higher sound quality than a conventional

compact disc (CD), while being compatible with existing CD players.

2.1 As specified in the description (*ibid.*, page 14, line 24 to page 15, line 14), the compatibility with an ordinary CD player is ensured by recording the 16 upper bits of a 20 bit audio sample as a sequence of pits according to the CD format. However, the data pits are deviated from the centre of the track in the left and right directions on the basis of an encoding scheme that allows the storage of the additional 4 lower bits of the audio sample. As pointed out in the application (*ibid.* page 18, last paragraph to page 19, first paragraph), the lateral displacement of the data pits is so limited that it does not affect the normal operation of the tracking servo, although it generates a high frequency component in the tracking servo signal which can be detected and processed by a suitable player (*ibid.* page 19, last paragraph).

Main request

3. Claim 1 according to the appellant's main request relates to an *"optical recording medium"* having tracks comprising the following features:

(a) each of the tracks is constructed by a plurality of pits, which are formed on the basis of sync data and first data to be recorded, and a land between the pits,

(b) said plurality of pits which are formed on the basis of said first data each have the same width and

(c) [said plurality of pits which are formed on the basis of said first data] are deviated from the centre of the track on the basis of second data,

(d) said plurality of pits which are formed on the basis of said sync data each have the same width as the pits formed on the basis of the first data and

(e) [said plurality of pits which are formed on the basis of said sync data] are formed centrally on said tracks to form a sync pattern.

As pointed out above (see section IV. above), claim 1 of the main request corresponds to the third auxiliary request refused by the Examining Division.

Article 123(2) EPC

4. In the application as originally filed (page 13, lines 12 to 15), it is specified that in "*case of the ordinary compact disc, as shown in Fig. 2C, the laser beam L is on/off controlled in accordance with the channel data D3 and a pit train having a pit width 0.5 [µm] is formed*". However, no value is given for the width of the sync pits, nor is it stated that the sync pits should have the same width as the data pits. Thus, feature (d) of claim 1 is not explicitly disclosed in the application as originally filed.

4.1 In a letter dated 3 July 2009 (page 2, first paragraph), the applicant essentially argued that the skilled person reading the application would directly and unambiguously understand that the pits had the same width whether they represented data or a sync pattern. As evidence that the pits representing the sync

patterns and the data pits were physically the same, the applicant had referred in the proceedings before the Examining Division (see letter dated 3 July 2009) in particular to Figure 6 of the original application and to page 9, line 20 to page 11, line 5, of the description.

4.2 The passage cited by the appellant relates to Figure 1 and essentially explains how data pits are generated by irradiating the recording medium with a laser beam of "a predetermined light amount" and by deflecting the laser beam by means of a mirror controlled by a driving circuit 7. In the appellant's view, feature (d) was the inevitable result of forming the pits with a single laser.

4.3 It is, however, part of the background knowledge of the skilled person that pits generated by the arrangement of Figure 1 are in fact quite different from the pits shown in Figure 6. In particular, it is known that the pit shape in the disc's tangential direction tends to vary with its length and that a laser beam generating a "predetermined light amount" will produce pits of increasing width towards the trailing edge as a result of the increasing temperature of the recording material, unless special provisions are taken to ensure a more or less constant pit width along the longitudinal axis.

In other words, the Board considers that Figure 6 provides only a schematic representation of the shape of the pits. The fact that all pits are represented as having the same width can only indicate to the skilled person that this pit dimension, in contrast to pit length, is not used to make the pits distinguishable or to encode information (cf. applicant's letter dated

3 July 2009, page 2, fourth paragraph). It cannot, however, be interpreted as a direct and unambiguous teaching that sync pits and data pits must have the same physical width.

4.4 Furthermore, sync pits are mentioned in the application only in connection with the solution to the problem of locating the track centre to avoid a tracking offset during reproduction (see original application, page 28, first full paragraph). There can be no doubt for the skilled person that also sync pits having a width different from the width of the data pit could be used to locate the track centre, as taught in the present application, provided that they are formed centrally on the tracks.

4.5 In summary, the Board is of the opinion that feature (d) cannot be directly and unambiguously derived from the original disclosure. It thus constitutes subject-matter that extends beyond the content of the application as originally filed (Article 123(2) EPC).

Inventive step

5. Notwithstanding the objection under Article 123(2) EPC raised against feature (d), the Board considers that it is appropriate in the present case to deal also with the appellant's arguments in support of the inventive step, as if all the features of claim 1 were originally disclosed.

6. In the contested decision the Examining Division considered document D1 as the closest prior art with respect to the then third auxiliary request and acknowledged that feature (d) was not shown in D1. However, this feature was the mere consequence of the obvious use of the recording apparatus of document D2. As this apparatus used only one laser beam, and not two like D1, the pits of the sync data would by necessity have the same width as the pits formed on the basis of the first data.

7. The appellant has submitted that document D2 should be regarded as the closest prior art and pointed out that this document did not mention sync patterns or sync pits. In the absence of a disclosure in D2 that some pits were not deviated from the track centre, there was a direct and unambiguous disclosure of all pits being deviated.

7.1 As it is generally known that an optical disk has sync pits and as D2 does not show sync pits or any of the other pit patterns required by an optical recording medium (cf. Figure 6 of the present application), the person skilled in the art, wishing to manufacture an optical recording medium according to the teaching of D2, had to rely on the technical knowledge common in

the field of optical media for the implementation of the sync pattern.

7.2 According to the appellant, the purpose of the synchronisation pattern did not require the pits to be centred on the track. Therefore, the skilled person had no reason to exclude the pits of the synchronisation pattern from being deviated to additionally store second data. On the contrary, it was in line with the teaching of document D2 to deviate all pits to increase the storage capacity of the disc.

8. Both documents D1 and D2 deal with the problem of increasing the recording capacity of an optical recording medium and provide a solution that consists in encoding part of the data as a displacement from the track centre in the right or left direction. The essential reason given by the appellant for preferring document D2 as the starting point of the invention was that D2 used a single laser for generating the pits, whereas D1 relied on two parallel laser beams.

8.1 The Board agrees with the appellant that in the present case it would be possible to start the assessment of inventive step from document D2. However, document D1 is, in the Board's opinion, a more appropriate starting point, since it discloses the use of sync pits for locating the track centre line and thus explicitly covers an important aspect of the present invention.

9. As acknowledged by the appellant, document D1 relates to an optical recording medium comprising a plurality of pit patterns for recording first and second data. Furthermore, D1 shows synchronisation pits arranged symmetrically with respect to the centre of the track (see D1', paragraph [0054]). As a sync pit is formed by

operating simultaneously two laser beams, it is wider than the data pits.

9.1 Hence, the subject-matter of claim 1 differs from the optical medium according to document D1 only in that the sync pits have the same width as the data pits (feature (d)).

10. As explained in paragraph [0055] of document D1, the sync pits are also used to detect a possible deviation of the pit patterns from the ideal track centre line and to calibrate the circuit that converts the lateral displacement of the data pits into binary form.

10.1 According to the appellant (see statement of grounds of appeal, point 5.13), the width of the sync pits was an essential aspect of the calibration of the displacement disclosed in document D1. The wider pits were used to set the threshold level used to discriminate between pits deviated in opposite directions. Although this compensated for poor tracking by adjusting the threshold, D1 did not disclose to the skilled person that it assisted in correcting the tracking error. Therefore, the skilled person was taught that a wide centred pit could be used to set the threshold, not that a centred pit of normal width could correct a tracking error.

10.2 In particular, the appellant stressed in its letter dated 25 July 2014 that the thresholding technique in D1 relied upon the fact that recording extra wide sync pits by using both lasers at the same time guaranteed that the positioning of the sync pits was coincident with the outer edges of the data pits. This in turn meant that the thresholding technique applied in D1 could be used reliably because the signal from the

centre of the sync pit would reliably be the centre point between the displaced pits.

10.3 According to the appellant, in order to arrive at the present invention, which relied only on pits having the same width, the skilled person would have to introduce a third laser directed to the centre of the track or articulate one of the existing lasers to record both the central position and the other position. Either modification would not occur to the skilled person because it would reduce the reliability of the method of document D1. In particular, it could not be readily assumed, for a single laser system, that the sync pit would reliably be recorded at the true centre position compared to the extremities of the deviated pits, because the recording of the sync pits would be subject to the same error in laser location as the deviated pits.

11. As shown in Figure 5 of document D1 and explained in paragraphs [0036] to [0042] of the English translation D1', a laser beam emitted by a laser 11 is divided into two beams by a splitter 12. After being modulated by a modulator 13, the first beam is directed by a mirror 20 onto the recording medium (i.e. a photoresist formed on a glass substrate 22). The second beam passes through a modulator 14 and a deflector 16 before being directed onto the recording medium. In this way, *"two pit series are accurately recorded in positions that are displaced in the track width direction"* (D1', paragraph [0041], last sentence).

11.1 As explained in paragraphs [0054] and [0055] of D1, for a correct reproduction of an optical medium which carries information also in the form of a pit displacement in the direction perpendicular to the

track centre, it is essential to identify the actual track centre upon reproduction. In fact, when the optical disc is read using a light beam that moves along the track centre line, as in a conventional CD player, the difference of the output signals from the photodetector 38 (see Figure 6) is positive or negative in accordance with the deviation of the reflecting pit from the track centre. If, however, the read laser is directed to one side of the ideal track centre due to an eccentricity of the disc or a tracking error, the difference of the output signals may not be indicative of the intended deviation of the recording pits from the centre line and the corresponding information may get lost.

Document D1 suggests forming the sync pits, which are needed for reproduction of an optical recording medium, by providing pits adjacently on the outside and inside of the track by simultaneous actuation of the first optical modulator 13 and a second optical modulator 14 according to Figure 5.

11.2 In the Board's opinion, an essential teaching that the skilled person derives from document D1 is that the synchronization pits must be symmetric with respect to the track centre line so that they can be used by the reproduction apparatus to identify the track centre. Obviously, the same information can be used by the tracking servo to guide the laser beam along the recording track.

It is evident that the only way to achieve a symmetric sync pattern with the apparatus shown in Figure 5 of document D1 is to operate the two beam modulators 13 and 14 simultaneously. As the skilled person realizes, the fact that the resulting sync pits are wider than

the data pits is the inevitable result of the use of the recording apparatus of Figure 5 and does not constitute a relevant feature of the optical medium.

11.3 In this respect, it is noted that according to the appellant the feature of the present invention that the sync pits had the same width as the data pits was the inevitable result of performing the process described in the present application, namely of using a deflectable laser beam. Similarly, it can be argued that the wider sync pits according to document D1 are the inevitable result of being formed by a recording apparatus with two fixed lasers.

Thus, as in the case of the present invention, the width of the sync pit is not a feature which contributes to the solution of a particular technical problem, but rather the direct consequence of the selection of a particular recording hardware.

11.4 Hence, starting from document D1, a problem addressed by the application could be seen in using a different recording apparatus for producing a recording medium comprising pits formed on the basis of first and second data, as specified in claim 1 of the main request.

11.5 It is evident to the skilled person that an optical medium comprising features (a) to (c) and (e) can be produced using a recording apparatus with a single deflectable laser beam. Furthermore, there can be no doubt for the skilled person that the reproduction of the resulting medium will also be affected by the problems identified in paragraphs [0053] and [0054] of D1' and that these problems can be solved by providing sync pits symmetrically arranged along the track centre, as suggested in D1'.

In the Board's opinion, the skilled person would furthermore realize that the only difference between the optical medium thus obtained and the optical medium shown in D1, namely sync pits and data pits having the same width (feature (d)), can have no detrimental effect on the reproduction of the recording medium.

11.6 In summary, the Board considers that it would be obvious to the skilled person to realize that the optical medium having data and sync pits arranged as taught in document D1 can be generated using a recording apparatus with a single deflectable laser beam, as the teaching of D1 does not require that the sync pits should be wider than the data pits.

In doing so, the skilled person would arrive at the subject-matter of claim 1 without involving an inventive step (Article 56 EPC).

First auxiliary request

12. Claim 1 according to the first auxiliary request differs from claim 1 of the main request essentially by:

- the substitution of the term "sync data" in features (a) and (d) with the term "header data":

- the addition of *"said tracks further comprising a series of frames, said frames having a head area"* in feature (a);

- the specification in feature (d) that *"said header data are formed in said frame head areas";*

- the deletion of *"to form a sync pattern"* in feature (e).

12.1 In the letter dated 25 July 2014, the appellant noted that the first auxiliary request was filed in response to added subject-matter objections raised for the first time by the Board in the communication accompanying the summons.

12.2 The Board agrees that the wording of claim 1 of the first auxiliary request relating to the bit pattern formed on the track centre corresponds more closely to the first and second full paragraphs of page 28 of the original description.

12.3 Considering that the amendments according to the first auxiliary request address some issues referred to in the summons to oral proceedings, the Board in the exercise of its discretion under Article 12(4) RPBA has decided to admit this request into the appeal proceedings despite its late filing.

Article 123(2) EPC

13. Claim 1 recites that the pits which are formed on the basis of the "*header data*" have *"the same width as the pits formed on the basis of the first data"*. As specified in the description (original application documents, page 28, lines 14 to 18), the pits arranged in the head area constitute the *"frame sync pattern and subcode"* and thus correspond, at least partly, to the *"sync data"* according to claim 1 of the main request.

13.1 As explained at points 4.1 to 4.4 above, the feature that sync pits and data pits have the same width is, in the Board's opinion, neither explicitly nor implicitly

disclosed in the application as originally filed. The same arguments and conclusions apply to the feature that the pits formed in the header area have the same width as the data pits.

13.2 Hence, claim 1 of the first auxiliary request does not comply with Article 123(2) EPC.

Article 56 EPC

14. The features that distinguish claim 1 of the first auxiliary request from claim 1 of the main request correspond essentially to the structure of a conventional CD. In fact, it is generally known that data recorded on a CD are arranged in frames and that each frame starts with header data comprising sync data and a subcode used to control functions of the reproducing apparatus.

14.1 Document D1 does not explicitly mention header data, but only sync data. However, this document specifies in paragraph [0059] that the invention relates to different kinds of optical discs, and to CDs in particular, and that compatibility with conventional systems is maintained (paragraph [0060]. It is thus implicit in D1 that the optical medium according to D1 has the same data structure of conventional CDs, and that the sync data are part of the header data.

14.2 The teaching common to the present invention and to D1 is that pits which are not used to store data should be centred on the track so that they can be used to identify the track center line. The present application specifies on page 28, lines 20 to 24 that not all header pits need to be centred on the track. To achieve the desired result, it would be sufficient to use a

single pit. On the other hand, it is obvious to the skilled reader of D1 that other easily identifiable bit patterns, apart from sync data pits, can be centered on the track centre and used to identify the track centre line.

14.3 Hence, in the light of the teaching of D1 and of the skilled person's general knowledge, the Board considers that the subject-matter of claim 1 according to the first auxiliary request does not involve an inventive step within the meaning of Article 56 EPC.

15. In summary, the Board comes to the conclusion that none of the appellant's requests provides a basis for the grant of a patent. Hence, the application has to be refused.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

I. Aperribay R. Moufang