BESCHWERDEKAMMERN DES EUROPÄISCHEN PATENTAMTS | BOARDS OF APPEAL OF THE EUROPEAN PATENT OFFICE | CHAMBRES DE RECOURS DE L'OFFICE EUROPEEN DES BREVETS

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File Number: T 196/90 - 3.5.2

Application No.: 84 900 644.0

Publication No.: 0 163 736

Title of invention: APPARATUS FOR PROCESSING PCM SIGNAL

Classification: G11B 5/09

D E C I S I O N
of 12 September 1991

Applicant: SONY CORPORATION

Headword:

EPC Article 56

Keyword: "Inventive step - yes, after amendment"

Headnote

Europäisches Patentamt | European Patent Office | Office européen des brevets

Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number : T 196/90 - 3.5.2

D E C I S I O N
of the Technical Board of Appeal 3.5.2
of 12 September 1991

Appellant : SONY CORPORATION
7-35 Kitashinagawa 6-Chome
Shinagawa-ku
Tokyo 141 (JP)

Representative : Ayers, Martyn Lewis Stanley
J.A. KEMP & CO
14 South Square
Gray's Inn
London WC1R 5EU (GB)

Decision under appeal : **Decision of Examining Division of the European Patent Office dated 3 November 1989 refusing European patent application No. 84 900 644.0 pursuant to Article 97(1) EPC.**

Composition of the Board :

Chairman : R.E. Persson
Members : A.G. Hagenbucher
L. Törnroth

Summary of Facts and Submissions

I. The present appeal lies from a decision of the Examining Division refusing Appellant's European patent application No. 84 900 644.0.

II. The reason given for the refusal was that the then valid Claim 1 did not involve an inventive step, having regard to common general knowledge and document

D1: GB-A-20 60 207.

The Examining Division essentially explained that according to D1 data signals in the form of data blocks (referred to as "sectors") are processed making up segments (referred to as "tracks") each comprising eight sectors. Each block is provided with an address consisting of two parts, namely a low-order block number and a high-order segment number. It followed that the segment number is the same for the eight blocks in each segment. An error-detecting code is used.

D1 further disclosed a circuit for detecting whether the segment addresses in the blocks of a given segment are identical. A predicted address is computed for each block and for all subsequent reads it is checked whether the predicted segment number corresponds to the next reproduced segment number. A block check is made independently of the sector check.

Although not particularly mentioned in D1, it was in the view of the Examining Division clear that in certain applications incorrectly reproduced data must be suppressed. The fact that Claim 1 referred to PCM data being stored was just an obvious choice.

III The Appellant argues that D1 concerns a different technical field from the present invention, i.e. reading information from accurately pre-recorded disks, and further submitted essentially the following:

D1 refers in addition to conventional error and parity checks to further checks, namely a "sector check", a "range check" and a "locked groove check" in order to control the correct skipping of the pick-up apparatus to a next track.

In the "sector check" a field number, which is a concatenation of the track and sector numbers, normally is read from a disk and compared with a predicted field number obtained from the previous field number. According to D1 the "sector check" is implemented, however, by comparing only the three significant bits of the predicted and read field number and not the most significant bits (track number in D1, segment address according to the present application).

A "range check" is only carried out after an attempt has been made to move the stylus. It is checked whether the difference between the predicted track number and the actual track number read is less than 63 tracks.

Within the "range check" no segment (track) numbers of two blocks (fields) read consecutively from the same segment (track) are checked for identity but only (deviation presupposed) whether they did not differ by more than a certain amount.

In the event that the "range check" fails, no compensation is applied to the data contained within a block but it is assumed that the block address has been read from the disk incorrectly and the device makes further attempts to

acquire the correct address on which to base its prediction.

The "locked groove check" is also performed only after an attempt to move the stylus has been made. If the result of this test is that the track (segment) numbers of the current and previous fields (blocks) are the same, then this is an error.

It appears that the Examining Division has confused the three tests "sector check", "range check" and "locked groove check" and has combined statements concerning these three tests in an erroneous way. The predicted field number used in D1 for performing its various tests is necessarily different from the field number of the block last read from the disk.

In contrast to this prior art the present application concerns the different field of PCM recording where signals read from a tape or disk might erroneously include blocks which do not belong to the data sequence currently being read but which are not necessarily detectable by conventional error detection or parity checks.

Such errors may happen when the angle at which the reading head is scanning the track does not correspond to the angle at which the tracks are recorded (cf. Figure 1 of the present application). They may also arise when the tape or disk has been used more than once. When a new recording is made on top of an older one, it is possible for patches of the old recording to "show through" the new recording. In both of the above situations, a block number may increment correctly but the sector address will change in mid-track and will be inconsistent. The present invention aims to solve the above problem by comparing the sector address of blocks read consecutively from the same

track. When such an error is detected its effects can be limited by conventional compensation technique such as muting or interpolation.

IV. After several communications of the Board, inviting the Appellant mainly to amend Claim 1, in particular in order to define more clearly the differences over the prior art, the Appellant filed a request for grant of a patent on the basis of the following documents:

Claims: 1 to 8 received 30 July 1991;

Description: pages 1, 3 and 8 as originally filed,
page 2(iv), received 30 July 1991,
pages 2a, 6 received 13 February 1989;
pages 4''', 5''', 7''' received
24 April 1991;

Drawings: pages 1/4 to 4/4 according to EP-A-0 163 736.

V. Independent Claim 1 now reads as follows:

"1. An apparatus for processing a PCM signal, wherein one segment of data consists of a plurality of blocks which include respective PCM data (D), segment addresses (S-ADR) that are the same for the blocks containing said segment addresses in a given segment, and a data error detecting code characterised in that it comprises:

a coincidence detection circuit (15) for detecting coincidence or non-coincidence of the segment addresses (S-ADR) included in said blocks of a given segment and producing a non-coincidence signal when said segment addresses do not coincide, wherein said coincidence detection circuit (15) includes one block interval latch

means (19) and detects for each block within one segment coincidence or non-coincidence between segment address data latched by said latch means (19) and the segment address of the subsequent block; and

compensating means (13) for performing data compensation in response to said non-coincidence signal from said detection circuit (15)."

Reasons for the decision

1. The appeal is admissible

2. The new Claim 1 complies with the requirements of Article 123(2) EPC. All the features of this claim can be found in original Claim 1 in conjunction with the description (cf. pages 5 to 8 and Figures 3 to 5 filed on 28 June 1985).

3. According to the prior art described on page 1 and page 2, first paragraph, of the present application, when a great number of errors occur and cannot be corrected by an error detection code in such a recorder, the error positions are detected and error compensation in the form of interpolation processing is performed by using two data values adjacent to error data. However, when using re-usable magnetic tapes there are circumstances which can result in a block being read from a tape which is self-consistent and apparently error free when error and parity checks are performed but which does not belong to the data sequence currently being read. The present invention aims at preventing pulse noise from being generated due to such type of error data.

4. The present invention solves this problem by comparing the sector address of blocks read consecutively from the same segment. When a segment address error is detected due to misalignment of the read-head while scanning at a wrong angle or due to "showing through" of old recordings, its effect is limited by conventional error compensation such as muting or interpolation.

The solution makes use of a single one block interval latch means storing the segment address of a block for comparison with that of the subsequent block.

5. Document D1 is, as the Appellant has submitted, concerned with a different technical field and another problem than that solved by the present invention.

It is aimed at preventing unnecessary movement of a pick-up device when information from accurately prerecorded disks are read. This is essentially solved by identifying uncorrelated field number data. The field number is a concatenation of a track number (which corresponds to a segment address of the present application) and a sector number (a sector in D1 corresponds to a block of the present application).

All the tests carried out by this prior art device, namely "sector check", "range check" and" locked groove check", are based upon a predicted field number which is calculated by incrementing the field number read from the disk and employing an incrementing counter but not a one block interval latch as in the presently claimed subject-matter.

Nor does D1 disclose a circuit for detecting whether the segment addresses in the blocks of a given segment are identical.

In a "sector check" it is only assumed that certain blocks belong to the same segment (track in D1). In performing a "sector check" the device according to D1 does not compare the fifteen most significant bits of the field number, but only the least significant three bits. Only the sector numbers are compared but not the track numbers (corresponding to the segment addresses of the present application).

A "range check" is not made for every field but only after an attempt has been made to move the stylus. It is checked whether the difference between the predicted sector number (segment address according to the present application) and the actual track number is less than 63 tracks.

D1 therefore does not check whether the segment (track in D1) numbers of two blocks (fields in D1) read consecutively from the same segment (track in D1) are the same, but checks whether they do not differ by more than a certain amount.

In the event that the "range check" fails, compensation is not applied to the data contained within a block but it is assumed that the block address has been read from the disk incorrectly and the device makes further attempts to acquire the correct address on which to base its prediction.

A "locked groove check" is also performed only after an attempt to move the stylus has been made. If the result of this test is that the track (segment number according to the present application) numbers of the current and previous field (blocks) are the same, then this is an indication of an error.

Finally, D1 does not deal with PCM signals nor with error compensation in the sense of error concealment as defined on page 4 ''', first paragraph of the description of the present application.

Hence, the subject-matter of Claim 1 is new and cannot be derived in an obvious manner from the state of the art relied upon by the Examining Division. Accordingly it constitutes a patentable invention. Claim 1, together with dependent Claims 2 to 8, can, therefore, serve as a basis for the grant of a patent.

Order

For these reasons, it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the Examining Division with the order to grant a patent on the basis of the documents indicated in paragraph IV above.

The Registrar: The Chairman: