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Aktenzeichen / Case Number / N<sup>o</sup> du recours : T 177/89 - 3.5.1

Anmeldenummer / Filing No / N<sup>o</sup> de la demande : 83 306 277.1

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Bezeichnung der Erfindung: Digital television system with error correction  
Title of invention:  
Titre de l'invention :

Klassifikation / Classification / Classement : H04N 11/00

### ENTSCHEIDUNG / DECISION

vom / of / du 16 October 1990

Anmelder / Applicant / Demandeur :

Patentinhaber / Proprietor of the patent /  
Titulaire du brevet :

RCA Licensing Corporation

Einsprechender / Opponent / Opposant :

Deutsche ITT Industries GmbH

Stichwort / Headword / Référence :

EPÜ / EPC / CBE Article 52(1), 56

Schlagwort / Keyword / Mot clé : "Inventive step (yes)"

Leitsatz / Headnote / Sommaire



Case Number : T 177/89 - 3.5.1

**D E C I S I O N**  
of the Technical Board of Appeal  
of 16 October 1990

**Appellant :**  
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**Representative :** -

**Respondent :**  
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**Decision under appeal :** Decision of the Opposition Division of the European  
Patent Office dated 11 January 1989 rejecting  
the opposition filed against European patent  
No. 0 107 463 pursuant to Article 102(2) EPC.

**Composition of the Board :**

**Chairman :** P. van den Berg  
**Members :** C. Biggio  
G. Paterson

## Summary of Facts and Submissions

- I. The European patent EP-B1-0 107 463 was granted on the basis of the European patent application 83 306 277.1 filed on 17 October 1983 and claiming its rights of priority from the patent application 435 777, filed on 21 October 1982 in the United States of America. The grant of the patent was published on 5 November 1986, in the EPO Bulletin No. 86/45.
- II. On 5 August 1987 the Appellant filed a notice of opposition against the grant of said patent, requesting its revocation on the ground that its subject-matter (Claims 1 to 5) lacked inventive step in the light of the following documents:
- D1: US-A-4 270 139,  
D2: DE-A-2 925 903,  
D3: "Semiconductors ITT, DIGIT 2000 VLSI Digital TV System, August 1982, pages 4-1 to 4-5  
D4: DE-B-2 628 662,  
D5: DE-A-2 757 166,  
D6: US-A-4 215 415,  
D7: US-A-4 340 940,  
D8: "Proceedings of the IEEE", Vol. 63, April 1975, pages 633 to 648.
- III. The granted Claim 1 reads:
- "A digital television signal processing system with error correction, comprising:  
means (25) for supplying first digital samples containing picture information;

a digital processor (32) operating on said first digital samples to derive therefrom second digital samples that contain picture information that is modified from the picture information contained in said first digital samples, said digital processor including within its processing chain a processing stage (45) that produces an output digital word that is subject to error when said digital processor is supplied with selected ones of said first digital samples such that said error results in the derivation of second digital samples containing erroneously modified picture informations; and digital-to-analog conversion means (49) responsive to said second digital samples for producing an analog signal containing said modified picture information: characterized in that said processing stage is subject to producing a truncation error and includes an adder (46) that develops said output digital word such that said adder produces either an overflow or an underflow condition upon the occurrence of said truncation error; in that means (70) is coupled to said digital processor for detecting said truncation error; and in that a latch (48), responsive to said truncation error detecting means (70), receives said output digital word and passes it towards said digital-to-analog conversion means (49) such that upon the detection of said truncation error said latch passes a modified output digital word corrected for the effects of said truncation error".

IV. In its decision of 11 January 1989, the Opposition Division found that:

- (a) the invention, as defined in granted Claim 1, relates to a digital television system with error correction, as defined in the precharacterising clause of said claim,

- (b) the problem to be solved by the system of the invention is the compensation of an error (overflow and/or underflow of the output of an adder; truncation error) in a digital television signal processing system in which such errors will affect the displayed picture (brightness and/or colour),
- (c) this problem was solved by the features defined in the characterising clause of granted Claim 1, i.e. the output of the adder is corrected for truncation errors by using a latch controlled by an overflow and/or underflow detector, and
- (d) the problem to be solved by the system of the invention was not dealt with by any of the documents cited by the Appellant.

Thus, pursuant to Article 102(2) EPC, the Opposition Division rejected the opposition on the ground that the subject-matter of granted Claim 1 is both novel and involves an inventive step, pursuant to Articles 52(1), 54 and 56 EPC, in comparison with the prior art demonstrated by the Appellant.

- V. On 10 March 1989 the Appellant lodged a notice of appeal against the decision of the Opposition Division and paid the appeal fees on the same day.

On 9 May 1989 the Appellant filed grounds of appeal, requesting primarily the revocation of the patent on the ground that its subject-matter (Claims 1 to 5) lacks inventive step in the light of the already mentioned documents D1 to D8, to which he further added document D9: S. A. Azizi, "Entwurf und Realisierung digitaler Filter", R. Oldenbourg München Wien, 1981, pages 282 to 288.

Subsidiarily the Appellant requested that the Board issue an intermediate clarifying communication and, further subsidiarily, the right to be heard at Oral Proceedings.

- VI. On 8 September 1989 the Respondent filed his comments on the Appellant's submissions, requesting primarily that the appeal be dismissed as not founded, subsidiarily the right to be heard at Oral Proceedings and, further subsidiarily, filed newly drafted Claims 1 to 6, to be considered without prejudice to granted Claims 1 to 5.
- VII. On 31 May 1990 the Board issued, joined to the Summons to Oral Proceedings to be held on 16 October 1990, an intermediate communication, stating its provisional opinion on the case and the subjects to be considered at the Oral Proceedings.
- VIII. In the Oral Proceedings on 16 October 1990, both Parties agreed that the relevant prior art documents to be considered in detail were D3 and D8.
- (A) The Appellant argued that the subject-matter of the granted Claim 1, whose features are defined in broad functional terms, could be arrived at by combining the teachings from D3 and D8. Therefore, the subject-matter of this claim does not involve an inventive step and the patent ought to be revoked.
- (B) Referring first to D3, the Respondent pointed out that the precharacterising clause of granted Claim 1 reads indeed on D3, but that this document does not mention at all the features mentioned in the characterising part of granted Claim 1, according to which the processing stage (45), which is subject to producing the truncation error, includes an adder (46) which develops the output digital words, thereby producing

either an overflow or an underflow condition upon the occurrence of said truncation error and concluded that this feature alone provides novelty in the claimed device.

Referring then to D8, the Respondent argued that even if the storage register disclosed by D8 ("REGISTER" on Fig. 6 thereof, page 636) might be considered equivalent to the latch (48) according to the patent, the way of functioning of these two devices is fully different.

He pointed out that in D8 said register stores temporarily the digital words (one at a time) before passing them, if they are found exempt from errors, to the digital-to-analog conversion means, but that, if an error is detected, said words stored in the register are lost and said lost digital words are replaced by a full-scale positive or a full scale negative number, whichever appropriate, provided from a different source.

He pointed out that on the contrary in the device according to granted Claim 1, the latch (48) not only stores temporarily the digital words (one at a time) before passing them on, if they are found exempt from truncation errors, to the digital-to-analog conversion means, but that, if an error is detected, the words stored in said latch (48) are corrected for said error within said latch (48) and then passed to the digital-to-analog conversion means.

For these reasons he concluded that the subject-matter of granted Claim 1 is both novel and involves an inventive step, pursuant to Articles 52(1), 54 and 56 EPC, in comparison with the prior art demonstrated by the Appellant.

He confirmed his primary request that the appeal be dismissed.

#### Reasons for the Decision

1. The appeal complies with Articles 106 to 108 and Rule 64 EPC and is, therefore, admissible.
2. The invention, as defined in granted Claim 1, relates to a digital television system with error correction, as defined in the precharacterising clause of said claim.
3. The problem to be solved by the system of the invention is the compensation of a truncation error in the output of a processing stage (45) comprised in a digital television signal processing system in which such errors will affect the displayed picture.
4. This problem is solved by the features defined in the characterising clause of granted Claim 1, i.e. the output digital word, from an adder (46) which is included in said processing stage (45), is corrected for truncation errors by using a latch (48) which receives said output digital word and is responsive to overflow and/or underflow detecting means (70) upon detection of said truncation error to modify the received digital word to correct said received digital word for the effects of said truncation error and pass the modified word towards digital-to-analog conversion means (49).
5. Document D3, in particular Figure 4-2 and the corresponding description, relates to a digital television signal processing system including a peaking circuit (emphasis of certain frequency components) and a limiter

combined with a multiplier connected to said peaking circuit; the function of the limiter is simply that of a well known limiter i.e. if the amplitude of the signal in question exceeds a predetermined maximum value it is limited to this maximum value.

Insofar as the document D3 is concerned, it is true that this discloses a limiter having a fixed superior limiting value and that if the amplitude of an applied signal exceeds that fixed limiting value, an error having the same characteristics as a "truncation error" is produced.

However, document D3 does not consider the error introduced by the limiter as being an error which should be corrected at a later stage, but merely as the obvious accepted effect of a voluntary limitation.

6. Document D3 thus discloses a digital television signal processing system with error correction according to the precharacterising clause of granted Claim 1. The subject-matter of Claim 1 is, therefore, not only novel, but also distinguished over the teaching from D3 by the features mentioned in the characterising clause of granted Claim 1 in a non-obvious way.
7. Document D8 relates to recursive digital filters in which overflow and/or underflow conditions of digital adders are detected and either corrected or suppressed, and discloses the overflow and/or underflow detection and correction in a recursive section (see: page 636, line 54 to page 637, line 25).

Figure 6 shows a storage register (REGISTER) inserted into the recursive portion of a second-order section, capable of holding one data word and connected thereto overflow and/or underflow detection means (boxes D) controlling a

box (C) which, upon detection of an overflow and/or underflow condition, blocks the output of the holding register (which is otherwise allowed through) and replaces the data word which has been found affected by an overflow and/or underflow error by putting out a full-scale positive or a full scale negative number, whichever appropriate.

The method used by D8 to detect overflow and/or underflow conditions is quite similar to that mentioned by the patent at issue and, consequently, the overflow and/or underflow detecting means according to D8 are also quite similar to those according to the patent at issue.

8. According to the above, and even if the storage register according to D8 might be considered equivalent to the latch (48) according to granted Claim 1, the Board is of the opinion that document D8 fails either to disclose or to suggest the features (see preceding point 4) mentioned in the characterising clause of granted Claim 1.

The subject-matter of Claim 1 has hence to be considered as novel and as involving an inventive step over the prior art represented by document D8.

9. The Board agrees with the Respondent that even if it would be considered as obvious to apply the teaching of D8 to a digital television signal processing system according to D3, the skilled person would still not arrive at a system according to Claim 1, without becoming inventive.

Therefore, the subject-matter of Claim 1 is also inventive over D3 and D8.

10. The Board also agrees with the reasoning of the Opposition Division in its decision, especially paragraphs 6 to 8 thereof.

11. Since none of the other prior art documents mentioned in the procedure affect the above conclusion, the Appellant's request is dismissed.

**Order**

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

**The appeal is dismissed.**

**The Registrar:**

**The Chairman:**

**M. Kiehl**

**P.K.J. van den Berg**