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**D E C I S I O N**  
of 20 September 1995

**Case Number:** T 0652/92 - 3.5.1

**Application Number:** 84112565.1

**Publication Number:** 0146713

**IPC:** H04N 11/00

**Language of the proceedings:** EN

**Title of invention:**

Multiplex subsampling transmission system for a high definition color television picture signal

**Patentee:**

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**Opponent:**

- 01: Philips Electronics N.V.
- 02: Deutsche Thomson-Brandt GmbH, Villingen-Schwenningen
- 03: GRUNDIG E.M.V. Elektro-Mechanische Versuchsanstalt Max Grundig holländ. Stiftung & Co. KG
- 04: INSTITUT FÜR RUNDFUNKTECHNIK GMBH

**Headword:**

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**Relevant legal provisions:**

EPC Art. 56

**Keyword:**

"Inventive step (yes)"

**Decisions cited:**

-

**Catchword:**

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Case Number: T 0652/92 - 3.5.1

D E C I S I O N  
of the Technical Board of Appeal 3.5.1  
of 20 September 1995

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**Decision under appeal:**

Decision of the Opposition Division of the  
European Patent Office dated 14 May 1992 revoking  
European patent No. 0 146 713 pursuant to  
Article 102(1) EPC.

**Composition of the Board:**

**Chairman:** P. K. J. van den Berg  
**Members:** A. S. Clelland  
M. Lewenton

### Summary of Facts and Submissions

I. European patent No. 0 146 713 was opposed by four opponents on the grounds that the subject-matter of the patent was not new or did not involve an inventive step (Article 100(a) EPC).

II. Opponent 1 (Respondent 1) referred inter alia to the prior art documents:

P1: Documents CCIR Study Groups Period 1982-1986, Document 10-11S/53-E, "A SYSTEM FOR BANDWIDTH REDUCTION OF HIGH-DEFINITION TELEVISION USING SUB-SAMPLING WITH MOTION COMPENSATION", dated 29 August 1983

P2: Interim meetings of CCIR Study Groups Period 1982-1986, European Broadcasting Union, Draft New Report, "TELEVISION STANDARDS FOR 625-Line 12 GHz SATELLITE BROADCASTING", not dated but apparently received by Respondent 1 on 18 July 1983.

Opponent 2 (Respondent 2) referred inter alia to:

T6: Windram et al. "MAC - Television System for Satellite Broadcasting", IBA report (not dated).

III. By a decision dated 14 May 1992 the Opposition Division revoked the patent. The Division found that the subject-matter of Claim 1 according to the main request (corresponding to Claim 1 as granted) was not new and that the subject-matter of Claim 1 according to the auxiliary request (corresponding to Claim 2 as granted) was not inventive. The Opposition Division inter alia decided that the subject-matter of dependent Claim 5 as granted did not involve an inventive step.

IV. The Patentee lodged an appeal against this decision and submitted a new, single, request with two independent claims. Claim 1 was based on a combination of Claims 1 and 5 as granted, with the added feature that the line synchronisation signal comprised three levels.

V. All four Respondents filed comments on the Grounds of appeal. On 28 July 1993, the Appellant filed two new requests, the main request ("Request I"), including a revised independent Claim 1 incorporating minor editorial amendment compared to that previously on file, together with dependent Claims 2 to 5.

VI. Claim 1 of the main request reads:

"A multiplex subsampling transmission system for a high definition color television picture signal, comprising at a sending end;

a means (1) for respectively compressing time axes of at least chrominance signal components among luminance and chrominance signal components of the sampled high definition color television picture signal,

means (1) for time-divisionally multiplexing said luminance and said chrominance signal components among which the time axes of at least said chrominance signal components are compressed, so as to obtain a time-divisionally multiplexed picture signal,

a means (2) for subsampling said time-divisionally multiplexed picture signal at every predetermined plural fields, so as to obtain a picture signal for narrow band transmission, and

a means (4,11) for forming a control signal required for restoring said picture signal for narrow band transmission into said high definition color television picture signal, so as to be transmitted together with said picture signal for narrow band transmission, and further comprising at a receiving end

a means (7) for supplementing said picture signal for narrow band transmission by inserting samples of said luminance and chrominance signal components which are lacked by the subsampling effected at the sending end, so as to restore said picture signal for narrow band transmission into said time-divisionally multiplexed picture signal under the control of said control signal separated from said picture signal for narrow band transmission, and

a means (8) for respectively expanding time axes of at least said chrominance signal components among said luminance and said chrominance signal components respectively separated from the restored time-divisionally multiplexed picture signal, so as to restore the sampled luminance and chrominance signal components into said high definition color television picture signal,

characterised in that said control signal consists of a line synchronizing signal having a sequence of three stepwise signal levels of the same polarity as a picture information signal, the sense of said sequence of stepwise signal levels being reversed at every other line synchronizing period, so as to obtain a reproduced line synchronizing pulse phase-locked on an average of said line synchronizing signals over plural line synchronising periods."

VII. The Appellant's arguments in support of the patentability of the subject-matter of Claim 1 can be summarised as follows:

The claimed TV transmission system was characterised by a line synchronisation signal which comprises three amplitude levels and which is inverted from line to line. The purpose of these features was to make the synchronisation more insensitive to non-linear amplification. A two-level signal, passed through a low-pass filter, would undergo smoothing which would disturb the transition, including the central portion of the timing edge, with the result that the timing would also be disturbed. A three-level signal which is periodically inverted, on the other hand, does not undergo this distortion since amplitude errors cancel out. The prior art on file, in particular P2, did not disclose these advantages or how to achieve them.

VIII. Respondent 1 presented in particular the following arguments:

The first part of Claim 1 was known from P1. The bandwidth-saving advantages of a three-level signal in comparison with a two-level signal were well known to the skilled man. The inversion of the line synchronisation signal was moreover known from P2, which disclosed the use of two line-alternating, digital synchronising words W1 and W2 which were each other's complement. The use of three-level sync signals was known per se from the following newly cited documents:

- P8: GB-A-887,532

- P9: FR-A-1,007,940

Respondent 2, referring to T6, argued that the inversion of the synchronisation signal was a known measure for obtaining a rugged frame sync.

Respondent 3 submitted that the appeal was not admissible since it was formally directed against the Opposition Division's decision as a whole but did not contain arguments in respect of all parts of that decision.

- IX. In a communication pursuant to Article 11(2) of the Rules of Procedure of the Boards of Appeal, dated 27 February 1995, the Rapporteur observed that in his preliminary view although various prior art documents disclosed some of the features of Claim 1, the problem underlying the invention appeared not to be disclosed. It was also considered that the Board should exercise its discretion not to admit documents P8 and P9 to the proceedings since their relevance was not such as to justify their late admittance. Oral proceedings were appointed.
- X. After all four Respondents had announced that they did not intend to attend, the oral proceedings were cancelled and the appeal procedure continued in writing. In a communication pursuant to Article 110(2) EPC dated 10 April 1995 the Rapporteur stated that in his opinion no grounds had been advanced which might lead the Board to refuse the Appellant's main request. Certain formal deficiencies in the patent documents were pointed out.
- XI. On 12 June 1995 the Appellant filed amendments to the description and to some of the dependent claims of the main request.

The Appellant's main request is grant of a patent on the basis of the following documents:

**Claims:**

Claims 1, 2, 4 (part), 5 filed on 28 July 1993 as "Request I";

Claims 3, 4 (part) filed on 12 June 1995;

**Description:**

Pages 8 to 14 as granted;

Pages 1 to 7 filed on 12 June 1995;

Inserts A, B and C filed on 12 June 1995;

**Drawings:**

Sheets 1 to 14 as granted.

The Respondents each request that the appeal be dismissed.

**Reasons for the Decision**

1. *Admissibility of the appeal*

1.1 Respondent 3 has argued that the appeal is inadmissible since, although formally directed against all aspects of the decision of the Opposition Division, it contains no arguments in respect of some parts of it. The mere indication that the Appellant "reserved the right to submit arguments" in respect of part of the contested decision was no substitute for arguments.

1.2 This seems tantamount to saying that in an Appeal against revocation the Appellant is obliged to appeal against every aspect of the decision. It follows from this argument that the Appellant must maintain his

claims unamended, since a narrower presentation of the invention than that considered by the Opposition Division implies that the Appellant is not appealing the entire decision.

- 1.3 Thus stated, it is clear that the argument is contrary to the established practice of the Boards and has no merit. The claims of the single request filed with the Grounds of appeal were more limited than the independent claim considered by the Opposition Division and arguments were advanced as to why these claims were allowable; the Board can see no reason why the Appellant should not appeal the decision insofar as it relates to this subject-matter. The theoretical question of whether the Appellant could subsequent to filing of the appeal have filed broader claims is not relevant to the present appeal. Thus, the statement that the Appellant reserved the right to submit arguments in respect of part of the contested decision is of no relevance.

2. *Amendments*

The Board is satisfied that the patent as amended does not contain subject-matter which extends beyond the content of the application as filed (Article 123(2) EPC) and that the scope of protection has not been extended during the opposition procedure (Article 123(3) EPC).

3. *Admissibility of P8 and P9*

The Board exercises its discretion under Article 114(2) EPC not to admit documents P8 and P9 to the proceedings. Their objective relevance is not such as to justify their late admittance. P8 and P9 are dated some 30 and 40 years respectively before the claimed priority dates and are concerned with line synchronization in an analog TV signal. There is nothing in either document which

would lead the skilled man, faced with the problem of line synchronization in a time-compressed time-division multiplexed HDTV signal, to the claimed solution.

4. *Inventive step*

Novelty not being at issue, only the question of inventive step requires consideration.

- 4.1 The Opposition Division decided that P2 was available to the public before the oldest date of priority of the contested patent, which is 19 October 1983. The Appellant has not argued against this finding and the Board agrees with the Opposition Division's conclusion.

T6 is not dated. However, the Appellant has never challenged the assertion that it was made available to the public in February 1983 and the Board is also prepared to accept this as a fact.

- 4.2 The invention is concerned with high definition television (HDTV). Such a system, the Japanese standard MUSE, is described in P1. The resolution of an HDTV image is far higher than that of conventional TV pictures and as a consequence the requirements for the line synchronisation signals are more stringent. The synchronisation is typically derived from a comparison of the sync signal with a threshold located, for example, midway between the maximum and the minimum values of the sync signal. The technical problem addressed is that non-linearities in the transmission channel may cause the line sync signal to be clipped, which leads to incorrect timing. This problem is solved in particular by the use of a three-level

synchronisation signal which is inverted on alternate lines, as set out in Claim 1. By averaging over many line periods a timing signal is obtained which is relatively insensitive to distortion.

- 4.3 The Opposition Division decided that these features were obvious (see point 4.5 of the decision together with page 5 of the minutes of the oral proceedings). The only argument on record (in the minutes) appears to be that "phase-locking a reproduced line synchronisation pulse is a well-known technique exploited in every TV-receiver".

This uncontested fact, however, does not explain why it would have been obvious to invert a three-level line synchronisation signal from line to line.

- 4.4 Respondent 1 has pointed out that P2, which concerns the TV standard C-MAC, discloses a digital "sync word" which is inverted from line to line (see page 7). The purpose of this feature is not however clear from the document and the Respondents have not been able to justify their assumption that the feature is connected with the problem addressed in the patent in suit.

- 4.5 Respondent 2 has referred to T6, which also describes C-MAC. The pertinent passages in this document are the following (page 8):

- "There are two line synchronisation words W1 and W2 which are sent on alternate lines. Their relative positions are inverted once every frame to provide a frame reference as shown in Table 2 below"; and

- "The first 8 bits of the digital burst provide not only the line syncs, but by inversion of the relative positions of the words once every frame a rugged frame sync is provided as shown in Table 2 above".

The words "frame reference" and "frame sync" show that this part of T6 is not primarily concerned with the line synchronisation but with the frame synchronisation. Therefore, in the Board's view, although T6 does disclose the inversion of the line synchronisation words for alternate lines it does not suggest that this is done in order to improve the line synchronisation in the presence of distortion. The teaching of T6 is therefore in the Board's view equivalent to that of P2.

- 4.6 It follows that the skilled person, starting out from P1 and wishing to improve the precision of standard line synchronisation so as to be suitable for HDTV and aiming in particular at increasing the system's insensitivity against distortion caused by non-linearities, had no reason for seeking a solution in P2, which does not mention this problem.

- 4.7 Moreover, even assuming that the skilled man would have considered the line synchronisation principle described in P2, he would still not have arrived at the present invention. The digital sync words used by C-MAC are periodically inverted but there is no suggestion that three stepwise signal levels are used, or that the sync words are also averaged over a plurality of line periods, as required by Claim 1. These features, which emphasize the analogue nature of the synchronisation signal according to the invention, would hardly be an evident addition to the known digital synchronisation signal.

4.8 There is no other prior art on file which comes closer to the invention than P2. Thus the subject-matter of Claim 1 is considered to involve an inventive step.

5. *The description*

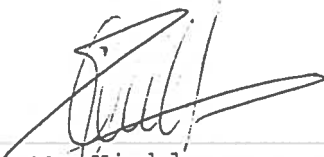
The Board notes that insert A to column 1 of the description contains an error: "1993" should be "1983". Furthermore, since the inversion of the synchronisation signal is essential for the invention, it appears necessary in order to comply with Rule 27 EPC to state in the description that it is known from prior art (C-MAC as disclosed in P2 or T6) to invert a digital synchronisation word from line to line.

**Order**

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


1. The decision under appeal is set aside.
2. The case is remitted to the first instance with the order to maintain the patent on the basis of the Appellant's main request, having regard to the comments at point 5 above.

The Registrar:



M. Kiehl

The Chairman:



P. K. J. van den Berg

