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

Internal distribution code:
(A) [ ] Publication in OJ
(B) [ ] To Chairmen and Members
(C) [X] To Chairmen

D E C I S I O N
of 4 December 1996

Case Number: T 0240/94 - 3.5.1

Application Number: 81901239.4

Publication Number: 0050152

IPC: H04N 5/76

Language of the proceedings: EN

Title of invention:
Sampling and re-formatting method and system for processing color video type signals to improve picture quality

Patentee:
HARRIS VIDEO SYSTEMS, INC.

Opponent:
Philips Electronics N.V.
Interessengemeinschaft für Rundfunkschutzrechte E.V.
Deutsche Thomson-Brandt GmbH Patent- und Lizenabteilung
GRUNDIG E.M.V Elektro-Mechanische Versuchsanstalt Max Grundig holländ Stiftung & Co. KG

Headword:
Color video type signals/HARRIS VIDEO

Relevant legal provisions:
EPC Art. 52(1), 56, 104

Keyword:
"Inventive step - no"
"Late filed auxilary request - admissible"
"Award of costs - refused"

Decisions cited:
-

Catchword:
-

Europäisches Patentamt | European Patent Office | Office européen des brevets

Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0240/94 - 3.5.1

D E C I S I O N
of the Technical Board of Appeal 3.5.1
of 4 December 1996

Appellant: (Proprietor of the patent)
HARRIS VIDEO SYSTEMS, INC.
1255 E Arques Avenue
Sunnyvale, CA 94086 (US)

Representative:
Beresford, Keith Denis Lewis
BERESFORD & CO
2-5 Warwick Court
High Holborn
London WC1R 5DJ (GB)

Respondent: (Opponent)
Philips Electronics N.V.
Groenewoudseweg 1
NL-5621 Eindhoven (NL)

Representative:
Kooiman, Josephus Johannes Antonius
INTERNATIONAAL OCTROOIBUREAU B.V.
Prof. Holstlaan 6
NL-5656 AA Eindhoven (NL)

Opponent:
Interessengemeinschaft
für Rundfunkschutzrechte E.V.
Bahnstrasse 62
D-40210 Düsseldorf (DE)

Representative:
Eichstädt, Alfred, Dipl.-Ing.
Maryniok & Partner
Patentanwaltskanzlei
Kuhbergstr. 23
D-96317 Kronach (DE)

Opponent:
Deutsche Thomson-Brandt GmbH Patent- und
Lizenzabteilung
Postfach 911345
300 Hannover 91 (DE)

Representative:
-

Opponent: GRUNDIG E.M.V
Elektro-Mechanische Versuchsanstalt
Max Grundig holländ. Stiftung & Co. KG
Kurgartenstrasse 37
D-90762 Fürth (DE)

Representative: -

Decision under appeal: **Decision of the Opposition Division of the European Patent Office posted 14 January 1994 revoking European patent No. 0 050 152 pursuant to Article 102(1) EPC.**

Composition of the Board:

Chairman: P. K. J. van den Berg
Members: R. Randes
C. Holtz

Summary of Facts and Submissions

I. European patent No. 0 050 152 was granted on 28 February 1990 on the basis of international application PCT/US81/00483 filed on 14 April 1981 and claiming priority from US application 140 550 dated 15 April 1980.

II. Opposition to the patent in its full extent was submitted by the four Respondents, each citing Article 100(a) EPC and arguing that the subject-matter of the claims lacked novelty and/or an inventive step. The patent was revoked for lack of inventive step in a decision announced in oral proceedings held on 24 November 1993, the written reasons being dispatched on 14 January 1994.

III. The following documents, inter alia, were considered during the opposition proceedings:

D1: DE-A-2 629 706
D2: DE-C-2 056 684
D4: US-A-4 084 181
D6: NTZ 1971, Heft 6, pages 321 to 325; L. Stenger et al.: "Möglichkeiten der digitalen Codierung und Übertragung von Farbfernsehsignalen"
D7: IEEE Transactions on Communications, vol. COM-23, No. 12, December 1975; K. Iinuma et al.: "Interframe coding for 4-MHZ color television signals"
D8: Fernseh- und Kino-Technik, No. 1/75; G. Brand: "Experimentelle Studie für ein Farbbildtelefonsystem"

IV. Notice of appeal, with the appropriate fee, was submitted by the Proprietor on 14 March 1994. A statement of grounds, including three further amended requests, was received on 23 May 1994. The Appellant made a conditional request for oral proceedings, as did three of the Respondents, maintaining that the subject-matter of the new claims still lacked an inventive step.

V. Oral proceedings were held on 11 January 1996. They were attended by the Appellant and Respondents (Opponents) I to III, Respondent IV having indicated the intention not to attend by fax received 9 January 1996.

In the oral proceedings, the Appellant modified his requests, making the previous second auxiliary request the new main request, and introducing new claims for a new single auxiliary request. As to the lateness of these requests the appellant argued as follows:

These new requests had already been communicated to the Rapporteur by telephone on the day before, but it had been agreed that the formal submission of these requests by fax on that day would not serve any practical purpose. The late filing had been unavoidable because of a combination of circumstances, including the relatively short notice given by the Board in its summons to oral proceedings, the fact that the annex to the summons contained an unexpected negative assessment of one of the technical advantages of the invention put forward by the Appellant, the inevitable difficulties of communication over the Christmas period, and the unavailability of the client's technical expert. A request for postponement of the oral proceedings had been submitted within the normal time limit for making written Responses.

The respondents requested that the main request be refused, the auxiliary request be rejected as inadmissible, alternatively that the procedure be continued in writing and the costs therefore by borne by the Appellant, alternatively that the auxiliary request be refused for lack of inventive step.

After deliberation on these requests, the Chairman announced that the Board refused the main request, as well as the requests for rejecting the auxiliary request as inadmissible and for the award of costs, and proceeded to discuss the substance of the auxiliary request, in order to decide on the request to continue the proceedings in writing.

VI. The new main request is to maintain the patent on the basis of claims 1 to 14 submitted with the statement of grounds of the appeal, and labelled "2nd auxiliary request", together with the drawings as published and a description still to be amended.

Independent claim 1 of the main request reads as follows:
"A method of video recording which comprises

(a) re-formatting a video signal from a composite analog form (Figure 1) to a sequentially-encoded analog form (Figure 2), the composite form of signal being arranged in video lines and each line having a predetermined overall temporal length comprising a blanking period and an active signal period comprising simultaneous luminance and chrominance components of predetermined temporal length less than said overall temporal length, the chrominance component of the composite form of signal being modulated on a sub-carrier, and the sequentially-encoded form of signal having for

each line sequentially arranged compressed luminance and chrominance signals of combined temporal length which is greater than the active temporal length and less than the overall temporal length of the composite form of signal; and

(b) recording said signal in said sequentially encoded analog form;
the reformatting comprising the steps for each video line of the composite form of signal of:
compressing the luminance component to form a compressed luminance signal;
compressing the chrominance component by sampling the chrominance component at a predetermined chrominance sampling clock frequency, temporarily storing the chrominance component samples in demodulated form, and reading the stored samples at a predetermined reading clock frequency higher than the chrominance sampling clock frequency to form a compressed chrominance signal; and
serially arranging the compressed luminance signal and the compressed chrominance signal to form the sequentially-encoded form of signal;
the luminance signal and chrominance signal being compressed in accordance with a predetermined relative compression ratio by sampling the luminance component at a luminance sampling clock frequency which is a predetermined multiple N of the chrominance sampling clock frequency, where N is the predetermined relative compression ratio, and which is less than the reading clock frequency, temporarily storing the luminance component samples in unmodulated form, and reading the stored luminance component samples at the same said reading clock frequency as for the chrominance component samples to form the compressed luminance signal;

said compression and said serial arranging of said compressed signals being such that one of said compressed signals occupies both a portion of said blanking period and a portion of said active signal period;
successive lines of said reformatted video signal being provided with line sync signals, each line sync signal being contained in the remaining portion of said blanking period; and
said reformatting further comprising analog to digital conversion performed so that said chrominance component samples and said luminance component samples are in digital form, and digital to analog conversion to provide said sequentially encoded signals in analog form."

Further independent claims 4, 7 and 10 are directed to "a method of reproducing a video signal from a video recording", "a video recording system", and "a system for reproducing a video signal from a recording", and consist of features corresponding to those of claim 1.

VII. In the Appellant's auxiliary request, the phrase in claim 1, "where N is the predetermined relative compression ratio", is replaced by, "where N is 4 and is the predetermined relative compression ratio", and equivalent amendments are made to independent claims 4, 7 and 10.

VIII. As to the main request the parties argued essentially as follows:

VIII.1 The Appellant

The inventor had defined a structure for a video recording signal which achieved the combined aims of good quality reproduction while being recordable on

low-cost, conventional recording equipment. The specific relevant features of this signal structure were: (1) a sequential format; (2) using a demodulated chrominance component; (3) compressing both luminance and chrominance components to avoid loss of picture quality due to one or other component being over-compressed; (4) using both active and blanking periods of the conventional composite signal for recording, but (5) keeping enough time free in the blanking period for a horizontal sync pulse in every line, as required by conventional recording mechanisms. The achievement of these combined aims was advantageous over the prior art and neither the prior art documents individually nor as a whole pointed to this advantageous structure. This was therefore an indication that an inventive step had been taken.

The invention was limited to recording and reproducing methods and apparatus for use with conventional analogue colour television signals and further limited to analogue recordings. Documents relating to digital television, specifically D6 to D8, should be considered irrelevant to assessment of the current invention. In particular D6 (relied upon by one of the Opponents) did not even disclose compression as such, merely sampling, and the signal structure of D6 was not subject to the horizontal sync pulse minimum length requirement of an analogue system.

While D1 was not actually concerned with the recording of a composite signal, it was, in terms of the signal structure, the closest prior art. In this disclosure, the chrominance component was compressed completely into the horizontal blanking period, and the luminance component was recorded, uncompressed, in the active period. This could only be done with acceptable results if the period remaining for control signals was so

reduced that there could only be a shortened sync pulse once every two lines, so that the signal structure put forward by this document could not be used in low-cost video recorders. There was a clear statement in D1 that it was advantageous not to compress the luminance, i.e. the opposite teaching to that of the contested patent. (The reference to compression of the luminance signal in claim 9 of D1, entirely unsupported by the description, should be ignored, as it clearly went against the teaching of the document as a whole.) By the teaching of the contested patent, room for a horizontal sync pulse could be kept in every line, while maintaining quality. It was disputed that (as argued by the Opponents) D1 also disclosed a structure in which a sync pulse occurred in every line. Such an idea was only mentioned in order to say that this was impossible and to go on to propose a sync pulse in alternating lines.

In D2, on the other hand, both luminance and chrominance components of the signal were compressed into the active period of the composite signal, with the blanking period being left as it was. The blanking period had to contain a burst signal, since the compressed chrominance signal was still modulated. Thus by failing to use a demodulated chrominance signal, the disclosure of D2 required a higher compression of the signals (and a consequent loss of quality) compared with the contested patent.

D4 disclosed a system in which there was a sync pulse in every line, but in which the luminance signal was uncompressed, leading to a highly compressed chrominance signal in the horizontal blanking interval. This disclosure failed to recognise that quality would be maintained by compressing the luminance as well as the chrominance.

The Rapporteur had raised doubts in the annex to the summons to oral proceedings whether it was necessary per se for maintenance of signal quality to compress the luminance, as previously argued by the Appellant in the statement of grounds of appeal. The Appellant argued that any assertion that the advantage set out in the specification of the patent was not in fact achieved amounted to an objection of insufficiency, which the Board was not empowered to introduce at this stage in the proceedings. Relevant jurisprudence of the Boards of Appeal was cited (T 0340/87, G 10/91). To the extent that the Appellant's assertion of an advantage in the claimed invention over the prior art was used as an indication of the existence of an inventive step, the Board should note that the Opponents had not disputed the achieved advantages. The onus of proof, if it were to be asserted that the advantage was not achieved, was on the Opponents (see T 0244/86). Hence the Board should, in judging inventive step, take it as given that the claimed advantage had, in fact, been achieved.

VIII.2 The Respondents

The claimed subject-matter was rendered obvious by the application of the teaching of D1 to the closest prior art disclosed in D2. D2 disclosed all the main features of the claim, except for the demodulation of the chrominance signal before compression, which was rendered obvious by at least D1 and D4, and the fact that the sequential signal (luminance and chrominance) was longer than the normal active period, with one of the two components overlapping both active and horizontal blanking intervals. D1 disclosed to the person skilled in the art that there was no obstacle to using the blanking interval to record signal components. D1 cited D2 and went on to say that by

using the blanking interval it was even possible to omit the compression of the luminance component. Reading claim 9 of D1 the skilled person would clearly have seen that if it was desired to keep more time free in the horizontal blanking interval, the luminance signal could be compressed. Thus the subject-matter of the independent claims would be reached without an inventive step.

It should be noted that in D1 the presence of a sync pulse only in every alternate line was given as a "Weiterbildung" (i.e. further development) of the invention, showing that D1 also contemplated an embodiment in which there was a sync pulse in every line.

The Opponents also argued that documents dealing with digital systems could not be dismissed as irrelevant. It should be considered that at the priority date of the contested patent analogue and digital TV systems did not belong to separate worlds and the engineer working on analogue systems would also have consulted documents discussing digital systems for relevant ideas. In particular D6 showed the allegedly new signal structure in Bild 3. Thus a combination of D2 and D6 would also lead to the claimed invention.

IX. As to the auxiliary request, the parties argued essentially as follows.

IX.1 The Appellant

The description clearly disclosed that a relative compression ratio of 4:1 was optimum (column 6, line 6). This statement had been in the application as filed. This optimum ratio could not be derived from the relevant documents. In particular, the fact that D6

mentioned sampling chrominance at a quarter of the sampling rate for luminance, was irrelevant. Apart from the facts that this document was concerned with a purely digital signal structure and did not actually deal with compression, the necessary sampling rates would be determined by the requirements of the Nyquist theorem relating sampling rates to bandwidth.

IX.2 The Respondents

The optimum value in the description was disclosed within an embodiment related to the NTSC system. It was therefore not clear whether the statement that a ratio of 4:1 was optimal was intended to apply only to NTSC, or to be general for all composite video signals. The matter for which protection was sought was therefore put into doubt, so that the new amended request violated Article 84 EPC.

As to the question of inventive step, there was no assertion in the patent specification that the optimum value disclosed was in any way inventive. The passage in which this value was mentioned in fact merely specified that substantially higher (e.g. 7:1) or substantially lower ratios should be avoided (a teaching which would in itself be obvious to the skilled person), and that the ratio could be varied in order to tailor the re-formatting to particular applications. It was a matter of routine work for the skilled man to seek and find the optimal relative compression ratio in the obvious range of acceptable ratios. The Appellant had not put forward that there was any surprising effect associated with the choice of 4:1 as the relative compression ratio. Further the optimal value might well be different for different systems (e.g. NTSC, PAL, SECAM).

It was also argued that the embodiment of D2 in which both chrominance and luminance were compressed already implicitly disclosed a relative compression ratio of 4:1. (The calculation was disputed by the Appellant.)

In D6 the relative **sampling** rate of 4:1, as actually claimed in the new auxiliary request, was also disclosed.

Additionally, the compression of the luminance given in claim 9 of D1, i.e. 1.1:1, was close to the 15% compression advocated in the contested patent, suggesting that the skilled person would, following D1, also arrive at something close to a relative compression ratio of 4:1.

X. After further deliberation it was announced that the proceedings would be continued in writing. The Respondents were given three months from the date of the oral proceedings to file any further arguments or evidence relating to the auxiliary request.

XI. In further written submissions filed within the specified time limit, the Respondents made arguments that the relative sampling frequency ratio of 4:1 was obvious in the light of any one of D6, D8 or the common knowledge of the person skilled in the art, in particular the Nyquist theorem and a knowledge of the relative bandwidths of chrominance and luminance signals. The argument was reiterated, with supporting calculations, that D2 already implicitly disclosed this ratio of compression in the case where both luminance and chrominance were to be compressed.

The Board allowed a number of months to pass in case the Appellant wished to comment on these submissions, but no such comments were received.

Reasons for the Decision

1. The appeal is admissible.

2. *The main request - novelty and inventive step*

It is not disputed by the Respondents that the combination of features currently claimed is novel with respect to the available prior art documents.

In the Board's view, the most appropriate starting point for considering whether the claimed invention shows an inventive step is document D2, in that it specifically concerns a method of or device for recording a composite colour signal (figure 2, "FBAS") in a sequential fashion. It is clear from D2 that the compressed chrominance and the luminance signals should have at least approximately the same bandwidth and that this bandwidth is limited by the available bandwidth of the recording medium, so that over-compression of any signal should be avoided (column 2, lines 42 to 48 and column 3, lines 16 to 18). Further in one embodiment, which is taken to be the starting point for considering the claimed invention, both luminance and chrominance signals are compressed.

The matter claimed in the independent claims of the current main request differs from the disclosure of this embodiment in D2 in the following ways:

(1) the chrominance signals are demodulated before sampling;

(2) the compressed signal is longer temporally than the "active signal period" of a normal television line;

(3) a particular mechanism for the compression is specified.

The Board considers that the skilled person in the field of colour TV signal recording and desiring to improve the system of D2 would consult document D1. D1 cites D2 (page 1 lines 10 to 20) as the nearest prior art, and would therefore clearly be of interest.

In the signal structure specified in D1, part of the blanking period is used for the sequential signal. In the preferred embodiment, the luminance signal is not compressed, and the entire compressed chrominance signal is stored during the blanking signal. It is taught (page 4 lines 3 to 6) to use the maximum possible time in the horizontal blanking period for the transmission (or storage) of the chrominance signal, clearly in order not to over-compress the signal. The inventor in D1 has therefore chosen to do without the sync pulse in every other blanking period. It would also be apparent to the skilled person, comparing the system of D1 with that of D2 that the line in D1 does not contain a burst signal, this being made possible by the fact that the stored chrominance signal in D1 is not modulated.

The designer in the contested patent had, as one of his goals, the ability to use a conventional low-cost video tape recorder mechanism (column 6, lines 33 to 36), a goal which in itself cannot be seen as showing

inventiveness. Hence he would not appear to be able to dispense with the sync signal at will. Thus while D1 would teach him to use part of the blanking period as well as the active period for recording, he would not be able to use an uncompressed luminance signal as preferred in D1 without over-compressing the chrominance signal, a problem of which he would be aware (see the passage of D2 cited above). Apparently therefore the designer could only take advantage of the teaching of D1 to the extent of converting the modulated chrominance signal to an unmodulated signal before compression and expanding the compressed signal of D2 to fill the active period and part of the blanking period, while preserving the sync signal and acceptable compression factors. This would seem to lead inevitably to the claimed feature that "one of said compressed signals occupies both a portion of said blanking period and a portion of said active signal period". Considering both that the skilled person starts from a system having a compressed luminance signal (D2) and that D1 clearly indicates the possibility of using a compressed luminance signal (claim 9), the Board considers that this compromise arrangement would be reached by the skilled person despite having to abandon what is clearly a strongly preferred element of the disclosure of D1, namely an uncompressed luminance signal.

As to the further feature distinguishing the current independent claims from the disclosure, namely the recital of a specific compression mechanism, both D1 and D2 discuss the requirements for compression circuits (D1 page 5 lines 14 to 25, D2 column 3 line 56 to column 4 line 5). In particular D1 discloses the fundamental mechanism for sampling and compressing an unmodulated signal. When it is desired to compress both chrominance and luminance in different ratios according

to their different bandwidths, the Board holds it to be a simple matter of everyday design to sample the two signals at rates whose ratio reflects the different bandwidths and to read them out at one appropriate rate.

D1 only discusses analogue storage of the sampled values. However D2 specifies that the memory for the samples may be digital (column 3 line 62), as currently claimed. This feature is clearly unaffected by whether the sample is taken from a modulated or unmodulated signal. The contested patent itself merely states that the storage for samples may be digital or may be analogue, and no technical problem is mentioned as being overcome by the choice of digital memory. Hence no inventive step is demonstrated by this feature of the current claims.

Hence in conclusion, the Board finds that the subject-matter of the independent claims of the Appellant's main request does not show an inventive step, and that the request is therefore not allowable.

It may be noted that in coming to this conclusion, the Board has not disputed the advantages achieved by the invention as put forward by the Appellant in that the sync pulse can be maintained in every line of the signal, although the blanking period is used for image information (see VII.1 above). The question of the Board's powers in this respect therefore does not arise.

3.1 The auxiliary request - admissibility and award of costs - continuance in writing

The current auxiliary request is prima facie a bona fide response to the negative opinion expressed by the Rapporteur in the annex to the summons to oral proceedings. In the light of the exceptional circumstances explained by the Appellant (see V. above), the Board decided to admit this new request despite its late submission. Since those circumstances were largely outside the control of the Appellant (in particular the short period for response given by the Board and the proximity of the Christmas period), it further does not appear equitable to make an award of costs against the Appellant.

On the other hand, the amendment proposed in the auxiliary request was new to the proceedings, and it was apparent that this request took the Respondents by surprise. Hence it also was necessary to allow the Respondents' representatives time to consult their clients and prepare an appropriate response. For these reasons the Board decided at the oral proceedings to continue the proceedings, insofar as they concerned the auxiliary request, in writing, and gave the Respondents a time limit of three months in which to submit any new arguments and or evidence.

3.2 The auxiliary request - inventive step

The Respondents have convincingly argued in their written submissions following the oral proceedings that when implementing the embodiment of D2 where both luminance and chrominance are compressed, the skilled person would be led inevitably to use a relative compression ratio of N = 4. While this conclusion was disputed in the oral proceedings, no rebuttal of the written mathematical calculation in the Respondents' submissions has been offered by the Appellant. The Board agrees with the Respondents' arguments on this

point. As discussed above, this embodiment is considered by the Board to be the prior art appropriate as a starting point for evaluating the question of inventive step as a whole. It does not appear to the Board that the adaptations of the prior art which the skilled person would make, also discussed above in relation to the main request, would change this compression ratio. Hence the introduction of this feature already implied in the nearest prior art into the claims cannot overcome the lack of inventiveness of the subject-matter of the independent claims of the main request.

Hence the auxiliary request must also be rejected.

Order

For these reasons it is decided that:

1. The request for declaring the auxiliary request inadmissible is refused.

2. The request for award of costs is refused.

3. The appeal is dismissed.

The Registrar:

M. Kiehl

The Chairman:

P. K. J. van den Berg

4/12.96

4/12.96

2771.D