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D E C I S I O N
of 10 November 2004

Case Number: T 1153/00 - 3.5.1

Application Number: 95106567.1

Publication Number: 0681401

IPC: H04N 7/08

Language of the proceedings: EN

Title of invention:
System and method for inserting data into a video signal

Applicant:
MICROSOFT CORPORATION

Opponent:
-

Headword:
Inserting data/MICROSOFT

Relevant legal provisions:
EPC Art. 83
EPC R. 27(1)(c)(e)

Keyword:
"Sufficiency of disclosure - no"

Decisions cited:
G 0002/93, T 1173/00

Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 1153/00 - 3.5.1

D E C I S I O N
of the Technical Board of Appeal 3.5.1
of 10 November 2004

Appellant: MICROSOFT CORPORATION
One Microsoft Way
Redmond,
Washington 98052-6399 (US)

Representative: Grünecker, Kinkeldey,
Stockmair & Schwanhäusser
Anwaltssozietät
Maximilianstrasse 58
D-80538 München (DE)

Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 7 July 2000 refusing European application No. 95106567.1 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: S. V. Steinbrener
Members: R. R. K. Zimmermann
B. J. Schachenmann

Summary of Facts and Submissions

I. European patent application number 95 106 567.1 (publication number 0 681 401) relating to the general field of video signal processing included, at the time of filing, various independent claims which covered a system and a method, respectively, for inserting a digital or analog data signal into a video signal (claims 7 and 24), for transmitting such a modified video signal (claims 1, 6 and 23) and for recovering the data signal from the modified video signal (claims 8 and 25).

The common basis of these different aspects of the claimed invention is the insertion of a pre-processed data signal into a (standard) video signal. Essential to the pre-processing step is the filtering of the data signal with a filter, a recirculating data buffer, a delay line filter or any other similar type of comb filter, which has a frequency response so that after appropriate modulation of the filtered data signal, the data signal spectrum fits into unused portions of the (standard) video spectrum.

II. The examining division raised a lack of disclosure objection pursuant to Article 83 EPC and finally refused the application on these grounds. According to the reasons given, the application did not enable the skilled person to carry out the claimed invention since neither one of the embodiments described in the application was suitable to recover the data signal from the combined data and video signal.

The comb filter shown in figure 6 of the application, if applied to an arbitrary data signal, deleted substantial portions of the signal spectrum, thereby substantially distorting the data signal itself. The application did not provide any information on how such distortions could be compensated. Regarding the recirculating data buffer shown in figure 5, the result was affected by updating the data buffer, which caused interferences between the data and the video signals; the signal generated by the data buffer was further distorted by the inverse filter of figure 8 which zeroed the signal during such cycles where the buffer was not refreshed.

III. The applicant lodged an appeal against the refusal of the application. The notice of appeal, including a debit order in respect of the appeal fee, and a written statement setting out the grounds of appeal were received by the European Patent Office on 18 September 2000 and 17 November 2000, respectively.

In a communication sent with the summons to oral proceedings the Board indicated that it shared, according to its provisional opinion, the view of the first instance department. The appellant was invited to explain how the invention worked, in particular how the skilled person would be able, without undue burden on the basis of the application as filed, to overcome the various problems and disadvantages in the prior art as alleged in the application with regard to document US-A-4 660 072.

IV. In a reply letter dated 11 October 2004, the appellant defended the claims on file and submitted amended

claims 1 to 24 as auxiliary request. Claim 1 according to this auxiliary request corresponds to original claim 7 and reads as follows:

"1. A system for inserting a data signal into a video signal, comprising:

a filter for receiving the data signal and producing a filtered signal having a plurality of spectral peaks with spacing corresponding to the spacing in an unused portion of the spectrum of the video signal; and

a modulator element for modulating a single carrier frequency having a predetermined phase with said filtered signal to produce a modulated filtered signal, said carrier frequency being selected to modulate said filtered signal into said unused portion of the spectrum of the video signal to produce a modified video signal containing said modulated filtered signal with said filtered signal inserted into said unused portion of the spectrum of the video signal."

V. Oral proceedings before the Board took place on 10 November 2004, where the matter was discussed with the representative. At the end of oral proceedings, the Board announced the decision on the appeal.

VI. According to the arguments submitted, the invention has overcome the problems and disadvantages present in the prior art system of document US-A-4 660 072. In principle, the invention was capable of inserting data at full bandwidth into a standard video signal, for example into a standard NTSC television signal. Although no complex modulation was necessary, the data

and video signals were prevented from interfering with each other. Nevertheless, the invention did not aim to maintain the bandwidth of the data signal and prevent interferences simultaneously, but intentionally accepted some limitation of the bandwidth of the data signal for preventing interferences. In the pre-processing step this was achieved by using a re-circulating buffer, or any other type of comb filter, for interleaving the bandwidth-limited data signal and the video signal without producing interferences between the signals.

VII. In document US-A-4 660 072 the added information signal had to be highly correlated with the standard luminance signal to avoid serious signal interferences, whereas the present invention worked with any arbitrary data signal even if unrelated to the video signal.

The appellant argued that the skilled person, easily realizing that the true data signal was not fully recoverable by means of the inverse comb filter shown in figure 8 of the application, had no difficulties to improve the filter on the basis of the information given in the application. In addition, even with the filter of figure 8 a residual data signal could be produced which the skilled person would know how and for which purpose to use.

In any case, however, the transmitting side of the inventive system was certainly functional since by comb filtering and modulating, the data signal could be inserted into the so-called Fukinuki hole of the video spectrum, without producing noticeable interferences with the luminance or chrominance components of the

video signal. By means of a comb-type filter any desired bandwidth of the data signal was achievable by distributing the signal power over the comb spectrum. The actual bandwidth transmittable via the system was thus not limited to the width of a single comb peak as the Board considered to be the case. Neither was the bandwidth an essential aspect of the invention. Any possible shortcomings or weaknesses in this regard were not a hindrance to carrying out the invention; it was undoubtedly within the realm of an ordinary skilled person to filter and modulate a data signal as disclosed in the application.

VIII. Accordingly, the appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of claims 1 to 31 as originally filed or, alternatively, on the basis of revised claims 1 to 24 in accordance with the auxiliary request filed with letter dated 11 October 2004.

As a further auxiliary request the appellant asked for continuation of the proceedings in writing.

Reasons for the Decision

1. The appeal complies with the requirements of Articles 106 to 108 and Rules 1(1) and 64 EPC and is thus admissible.

The appeal, however, is not allowable since the invention as claimed, be it on the basis of the main or the auxiliary request, fails to meet the requirements of Article 83 EPC.

2. Pursuant to Article 83 EPC, the European patent application "must disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art". The Enlarged Board of Appeal held in decision G 2/93 - Hepatitis A Virus / UNITED STATES OF AMERICA II (OJ EPO 1995, 275), point 4 that a European patent application, in order to meet the requirements of Article 83 EPC, must "contain sufficient information to allow a person skilled in the art, using his common general knowledge, to perceive the technical teaching inherent in the claimed invention and to put it into effect accordingly".

The source of relevant information is thus not limited to the embodiments and examples explicitly described in the application. Any deficiency affecting such embodiments or examples, or any other inappropriateness to put them into practice, are not *per se* a sufficient ground for an Article 83 objection, although such kind of deficiency might justify an objection under Rule 27(1)(e) EPC.

However, the requirement of disclosing an invention and thus the "technical teaching" inherent in the invention (see above) means that a technical problem (even if not expressly stated as such) and its workable solution must be disclosed in the original application documents (see also Rule 27(1)(c) EPC). Since the notional person skilled in the art by definition is uninventive in using the resources of its technical field and working out a problem solution on its own, the application must clearly identify the technical problem to be solved and contain sufficiently clear and complete instructions

how to use certain technical means successfully to carry out the invention in practice within the whole range of the claim (see for example the decision T 1173/00 - Transformer with high-temperature superconductor for locomotives, OJ EPO 2004, 16, point 3.2).

The invention must have been completed at the date of filing the application: any lack of necessary information would thus be detrimental to the patentability of the invention if the skilled person was not able at the filing date to fill the informational gap on the basis of the general technical knowledge or by making appropriate experiments.

A valid approach to Article 83 EPC thus consists in answering the following two questions: firstly, are the technical problem and the technical means to be used clearly identifiable in the application, and secondly, does the application give sufficiently clear and complete instructions regarding the use of such technical means to reduce the invention to practice without undue burden.

3. In the present case the answer to the second question is negative. First, it is necessary to determine the (subjective) technical problem, which is identifiable from the application as filed. The technical problem which is part of the teaching inherent to the claimed invention is clearly derivable from the following text portions of the application (underlining added):

Column 1, lines 3 to 6 of the published application: "The present invention relates generally to video

signal processing and more specifically to a system and method for inserting data into a standard video signal."

Column 2 line 53 to column 3, line 6: "As described in the prior art, that spectral "hole" in the spectrum is currently unused, and could carry additional information. (...) Note that the additional information signal is added to an unused portion of the spectrum that, in an ideal case, will cause no interference with the normal video signal processing.

The use of this spectral hole is described in U.S. Patent No. 4,660,072, which is incorporated herein by reference. (...)"

Column 3, line 41 to column 4. line 20: "The selection of a 30 Hz square wave as a modulation source creates additional problems not solved by the system described in the U.S. Patent No. 4,660,072. (...) The modulation by many multiple frequencies increases the possibility that the additional luminance signal will overlap in the frequency domain with the video signal. The overlap with the video signal may not present a significant problem in the application described in the patent because the additional luminance signal is highly correlated with the NTSC standard luminance signal, so the interference may not be noticed by the viewer.

However, if the additional information signal added to the standard video signal is unrelated to the video signal, the approach disclosed in U.S. Patent No. 4,660,072 may be unsuitable because the interference with the video signal may be intolerable. Furthermore,

there may be unacceptable interference for the additional information signal itself. To avoid interference, it is necessary to reduce the bandwidth of the additional information signal. There is theoretically a 1.8 MHz bandwidth available in the unused portion of the chrominance spectrum. Because standard modulation creates two sidebands, the actual data bandwidth is limited to 0.9 MHz. The modulation technique proposed in U.S. Patent No. 4,660,072 causes an unacceptable spectral spreading of the additional information signal that can cause interference with normal television operation.

Therefore, it can be appreciated that there is a significant need for a system and method for introducing an additional information signal into a video signal without the undesirable effects of signal interference or reducing bandwidth to avoid interference."

Column 5, line 36 to column 6, line 6: " The present invention resides in a system and method for introducing an additional information signal into an NTSC signal without a reduction in bandwidth. The additional information signal may be an analog data signal or a digital data signal. Whichever form the additional information signal may take, it will be referred to herein as a data signal.

As previously discussed, the technique disclosed in U.S. Patent No. 4,660,072 modulates the incoming data signal with the 3.579545 MHz carrier signal that switches the phase of the carrier signal at a 30 Hz rate. The method described therein requires that (...). Unfortunately,

this means that the effective bandwidth is reduced to one-half the theoretical bandwidth because the data is repeated each frame. This approach also requires that a frame of data be stored in a buffer so that it can be inserted twice. A large buffer complicates the circuit design and increases the cost of the circuit.

The present invention inserts a data signal into the unused portion of the spectrum in a manner that does not require complex modulation of the data signal and which prevents the data signal from interfering with the video signal."

4. It follows from these text portions that the US-document referred to is taken as reference which is to be improved regarding the alleged disadvantages, i.e. the reduction of the effective bandwidth available for transmitting the data signal, the unacceptable spectral spreading, the undesirable signal interferences and the complexity of the circuit in the prior art system. In particular, the resulting trade-off between reducing interferences at the expense of bandwidth is considered disadvantageous. Since the application explicitly qualifies the limitation of the theoretical bandwidth of 1,8 MHz to allegedly 0.9 MHz as a disadvantage of the prior art, the invention as claimed promises to improve such 0.9 MHz bandwidth at reduced signal interferences and without increasing the complexity of the circuitry. Moreover, the application asserts that the invention achieves such goals even with a data signal which is unrelated to the video signal.

5. The submission of the appellant that the invention intended to prevent interferences actually by reducing

the bandwidth of the data signal, is not in compliance with the content of the application as filed. Only avoiding interferences, at the expense of reduced bandwidth, would mean a fail of the invention in the light of the prior art document US-A-4 660 072 which the application claims to improve. The invention would then be shifted to an imaginary technical problem which the skilled person would not be able to identify in, or to understand from, the application as filed. The less ambitious formulation of the technical problem as proposed by the appellant can thus not be accepted by the Board.

6. The technical means disclosed are essentially an analog or digital filter (see also column 11, lines 3 to 7) - according to the embodiments a recirculating data buffer (figure 5) or a delay line filter (figure 6) - as an input stage receiving the data signal (see figure 4), furthermore a modulator element modulating a carrier signal with the filtered data signal, and an adder adding the modulated data signal to the standard video signal (see transmitter portion 102 in figure 4 of the application and the accompanying parts of the description).

The second question to be answered is therefore whether such technical means allow to solve, successfully, the disclosed technical problem, i.e. inserting a data signal unrelated to a standard video signal into the video signal without sacrificing bandwidth of the data signal for avoiding unacceptable spectral spreading and interferences (the relative simplicity of the circuitry being acknowledged).

7. The Board concedes that the invention could work for very restricted sorts of signals, namely data signals which are *per se* encoded in such a manner that the relevant information is concentrated in comb-like portions of the frequency spectrum. However, such type of encoding, in particular if such portions have to cover at least 0,9 MHz, would not be trivial and should have been disclosed in sufficient detail. Actually, the application discloses the contrary: although the data signal is analog or digital and unrelated to the video signal, it is nevertheless fed directly into the filter (see, for example, figure 4). The negative reference to the prior art system regarding the correlation of the additional information signal and the video signal (see column 3, line 44 to column 4, line 3) is pointing into the same direction; it implies that the invention worked with arbitrary data signals having components in the whole frequency range, for example up to 0,9 MHz, or even higher.

8. The scope of the claim thus encompasses data sources which produce a spectral spreading extending over several peaks of the standard video signal regardless of the modulation applied.

9. Since the video signal has strong signal components in the overlapping frequency portions, filtering of such a wide-spread data signal by means of a simple comb filter would remove, or at least seriously attenuate, some of the important information components from the data signal so that the data could not reliably be recovered from the combined data and video signal. The Board is thus not convinced that the invention can be carried out by filtering the data signal, or by using

the delay filter of figure 6 or by using any other such type of 1D comb filter, if the data signal is arbitrary and unrelated to the video signal. Using sophisticated types of comb filter, however, would (apart from being not disclosed in the original application documents) contravene the teaching of the application which criticises the complicated and costly circuit design and the complex modulation of the prior art system (see column 5, line 53 to column 6, line 6).

10. Having regard to the recirculating data buffer of figure 5 the output signal produced may well be fitted into the video signal in a manner that the data are recoverable without producing unacceptable interferences in the data and the video signal. However, in order to transmit some bandwidth, actually at least 0,9 MHz according to the application (see above), the data buffer must be refreshed at a rate of this order of magnitude, which would produce an spreading of the signal spectrum far greater than the peak distance of 30 Hz or even only 15 Hz of the video spectrum.

To avoid such spreading, the application explains in column 7, line 55 to column 8, line 27 that the data was "completely changed every 2 to 4 times that the data is repeated by the data buffer". In the embodiment described, the buffer "is played back continuously at a 60 Hz rate", i.e. the data rate is approximately 15 to 30 Hz. The bandwidth achievable by such a refresh and read out scheme is apparently far lower than the 0,9 MHz of the prior art. On the basis of such a data buffer the invention clearly fails to solve the technical problem it intended to solve.

11. Despite an invitation by the Board the appellant was not able to give any example for a system in which the invention had been - or could be - put to practice.

12. Since the filtering and the insertion of the data signal into the standard video signal is the (sole) subject-matter of claim 7 of the main request and claim 1 of the auxiliary request, the Board concludes that these requests do not meet the requirements of Article 83 EPC.

13. Since the filtering and the insertion of the data signal is also an essential feature of the whole system of transmitting and receiving a data signal as described and claimed in the application, the Board sees no prospect for any amendment which by limiting the claims to a particular aspect of such a system would overcome the objection of insufficient disclosure. It is thus considered futile to continue the proceedings in the appeal stage, or to remit the case to the first instance department, so that the further auxiliary request for continuation of the proceedings in writing is not allowed either.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

M. Kiehl S. V. Steinbrener