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D E C I S I O N
of 10 January 2006

Case Number: T 0266/03 - 3.5.03

Application Number: 93110215.6

Publication Number: 0593850

IPC: H04B 1/66

Language of the proceedings: EN

Title of invention:
Method and apparatus for subband filtering of a stereo audio signal

Patentee:
SAMSUNG ELECTRONICS CO., LTD.

Opponent:
Koninklijke Philips Electronics N.V.

Headword:
Subband filtering of a stereo signal/SAMSUNG

Relevant legal provisions:
EPC Art. 56, 123(2)

Keyword:
"Inventive step - main and first auxiliary request (no)"
"Amendments - second auxiliary request - added subject-matter (yes)"

Decisions cited:
-

Catchword:
-

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Case Number: T 0266/03 - 3.5.03

D E C I S I O N
of the Technical Board of Appeal 3.5.03
of 10 January 2006

Appellant: (Proprietor of the patent)
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Decision under appeal: **Decision of the opposition division of the European Patent Office posted 13 December 2002 revoking European patent No. 0593850 pursuant to Article 102(1) EPC.**

Composition of the Board:

Chairman: A. S. Clelland
Members: F. van der Voort
R. Menapace

Summary of Facts and Submissions

I. This appeal is against the decision of the opposition division revoking European patent No. 0 593 850 on the ground that the subject-matter of claim 1 as granted did not involve an inventive step (Article 56 EPC).

II. During the opposition proceedings, the opponent referred, *inter alia*, to the following documents:

E1: EP 0 457 391 A;

E2: D. R. Welland *et al*, "A Stereo 16-Bit Delta-Sigma A/D Converter for Digital Audio", J. Audio Eng. Soc., Vol. 37, No. 6, June 1989, pages 476 - 486; and

E4: US 4 868 868 A.

III. The proprietor (appellant) lodged an appeal against the decision and requested that it be set aside and the patent be maintained as granted. Oral proceedings were conditionally requested.

IV. The parties were summoned by the board to oral proceedings. In a communication accompanying the summons, the board drew attention to issues to be discussed at the oral proceedings.

V. Oral proceedings were held on 10 January 2006. The appellant requested that the decision be set aside and the patent be maintained either as granted (main request) or on the basis of claims 2 to 4 as granted (first auxiliary request) or on the basis of claim 1 as

filed with letter of 12 December 2005 (second auxiliary request). The respondent requested that the appeal be dismissed. At the end of the oral proceedings the board's decision was announced.

VI. Claim 2 as granted reads as follows (emphasis added):

"An apparatus for performing subband encoding of a first audio signal, comprising:

a first input memory (91a) for storing first audio data inputted through an input terminal (90a) thereof;

a coefficient memory (92) for storing a set of filter coefficients therein;

a memory controller (93) for controlling address designation and read/write operations of said first input memory (91a) and said coefficient memory (92);

a first multiplier (94a) for multiplying the first audio data from said first input memory (91a) by said set of filter coefficients outputted from said coefficient memory (92); and

a first accumulator (95a) for accumulating the operation results from said first multiplier (94a); **characterised by** the following means for simultaneously and in parallel encoding a second audio signal:

a second input memory (91b) for storing second audio data inputted through an input terminal (90b) thereof and which read/write operations are controlled by said memory controller (93);

a second multiplier (94b) for multiplying the second audio signal by said set of filter coefficients outputted form *[sic]* said coefficient memory (92); and

a second accumulator (95b) for accumulating the operation results from said second multiplier (94b);

wherein the first audio signal represents the right (R) channel of a stereo audio signal and the second audio signal represents the left (L) channel of the stereo audio signal."

VII. Claim 1 of the second auxiliary request corresponds to claim 2 as granted with the addition of the following wording:

"and further comprising

a frequency translation coefficient memory (127) for storing coefficients for frequency translation,

a memory controller (128) for controlling address designation and read/write operations of the frequency translation coefficient memory (127), and

a coefficient selector (129) for selectively outputting the filter coefficients from filter coefficient memory (125) and the frequency translation coefficients from frequency translation coefficient memory (127)."

Reasons for the Decision

1. *Inventive step - claim 2 as granted*

1.1 Document E4 (see Figure 7 and column 6, line 56 to column 7, line 2) discloses a sub-band speech analyzing device comprising a FIR filter 4 including an input memory 5 for storing audio input data, i.e. speech, a coefficient memory 6 for storing a set of filter coefficients, a memory management unit 7 for controlling addressing and read/write control of the memories 5 and 6, a multiplier 8 for multiplying the

audio input data from the input memory 5 by the set of filter coefficients outputted from the coefficient memory 6, and an accumulator 9 for accumulating the products from the multiplier 8. The device can be used in speech analyzing equipment employing a subband coding system (column 9, lines 4 to 9 and column 1, line 14). It follows that the features according to the preamble of apparatus claim 2 are known from E4. This was not contested by the proprietor.

1.2 The characterising features of claim 2 (see point VI above) result in the claimed apparatus being suitable for processing a stereo signal. Furthermore, since for both left and right channels the same set of filter coefficients is used, the required filter coefficient memory space is correspondingly reduced, which permits a high integration of the hardware (see also paragraphs [0031] and [0039] of the patent in suit as published).

1.3 The problem underlying the claimed subject-matter may therefore be seen in providing an advantageous adaptation of the device of E4 such that it can process a stereo signal.

1.4 The formulation of this problem does not contribute to an inventive step, since at the priority date of the patent in suit digital processing of stereo audio signals was generally known (see, e.g., E2, page 476, left column, lines 1 to 3 and 9 to 12, and E1, column 18, lines 43 to 47).

1.5 The appellant did not contest the board's view that at the priority date of the patent in suit it was well-known that signal processing means for processing a

stereo signal were essentially comprised of twice the components required for the processing of a mono signal, e.g. including two separate amplifiers, one for each channel, in which, however, some of the components were normally provided only once for common use by both left and right channel processing means in order to save space and costs of the hardware, e.g. by including a common power supply.

The board further notes that E4 explicitly describes the advantage of a reduction in memory space and circuit size being achieved by reducing the required number of filter coefficients and input data to be stored in the input memory 5 and the coefficient memory 6, respectively (see column 8, line 48 to column 9, line 3).

1.6 Starting from E4 and taking into account the common general knowledge at the priority date, it would thus have been obvious to the person skilled in the art, faced with the above-mentioned problem, to duplicate the sub-band encoding device of Figure 7 of E4, with the proviso that any unnecessary duplication is to be avoided in order to save space and costs. A duplication of the FIR filter 4 of the device of Figure 7 of E4 implies that the same filter coefficients are to be used in each channel. In order to avoid an unnecessary duplication of the required memory space by storing the same filter coefficients twice, the skilled person would, in line with the above teaching of E4, reduce the number of coefficients to be stored by implementing the filter coefficient memory 6 such that it stores a single set of filter coefficients for application to both left and right channels under the control of a

common memory management unit 7. In doing so, he would arrive at an apparatus which is suitable for simultaneously encoding in parallel a stereo audio signal and which includes all the features of claim 2.

1.7 The appellant argued that the skilled person would not provide a common set of filter coefficients for both channels, since this introduces the risk of crosstalk between the two channels and, hence, a deterioration of the performance of the apparatus.

The board cannot accept this argument. The filter coefficients stored in the memory are merely for setting the filter characteristics of the digital FIR filter independently of the input data, cf. E4, column 6, equation (6). After duplication, each of the left and right input signals is separately and digitally processed in respective multipliers and accumulators. Hence, there cannot be any quality loss due to the use of a common set of filter coefficients. In fact, providing a common set of filter coefficients increases the performance of the apparatus in that it establishes identical filter characteristics for both left and right channels.

1.8 The subject-matter of claim 2 as granted therefore lacks an inventive step having regard to E4 and taking into account the common general knowledge of the skilled person (Articles 52(1) and 56 EPC). It follows that the main request and the first auxiliary request cannot be allowed.

1.9 In view of the above conclusion on claim 2 it has not been necessary to consider claim 1 of the main request, an independent method claim.

2. *Amendments - second auxiliary request*

2.1 The appellant argued that claim 1 of the second auxiliary request is based on claim 2 as granted and, in addition, the particular features of the embodiment illustrated in Figure 19 and described in paragraphs [0033] and [0034] of the patent specification.

2.2 The board notes that the first part of claim 1, which corresponds to claim 2 as granted, defines an apparatus which, in accordance with the reference signs used, corresponds to the embodiment shown in Figure 17 of the application as filed, up to and including the accumulators. The additional features of claim 1 are, in accordance with the reference signs used and as argued by the appellant, derived from the embodiment shown in Figure 19.

2.3 The embodiment of Figure 19 is however described as "*another embodiment of the subband filtering apparatus*" (see the application as published; page 6, lines 33 and 34 regarding Figure 19 and page 6, lines 7 and 8 regarding Figure 17). The embodiment of Figure 17 includes, *inter alia*, two multipliers 94a, 94b, two accumulators 95a, 95b and data input terminals 90a, 90b connected to respective input memories 91a, 91b, whereas according to Figure 19 there are no input memories, only a single multiplier 130, a single accumulator 131, and an input data selector 124 which is connected to the data input terminals 120a, 120b.

This confirms that the figures indeed show different embodiments. It is therefore not immediately evident from these figures that the respective embodiments may be combined. Nor does the description provide any suggestion to do so. In any case, even if for the sake of argument a combination of these embodiments were disclosed, the application as filed would not provide a basis for subsequently omitting the input data selector 124 from the combination, as is the case in claim 1 of the second auxiliary request, which corresponds to a combination of the embodiment of Figure 17, up to and including the accumulators, with, however, only the memory 127, the controller 128 and the coefficient selector 129 being taken from the embodiment of Figure 19.

2.4 The board accordingly concludes that the application as filed does not provide a basis for the combination of features as defined in claim 1. The claim thus contains subject-matter which extends beyond the content of the application as filed, thereby contravening Article 123(2) EPC. Therefore, the second auxiliary request cannot be allowed either.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

D. Magliano A. S. Clelland