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**Datasheet for the decision
of 13 January 2010**

Case Number: T 1055/07 - 3.5.02

Application Number: 03018309.9

Publication Number: 1389831

IPC: H03H 17/06

Language of the proceedings: EN

Title of invention:

Method and system for decimating an indexed set of data elements

Applicant:

Broadcom Corporation

Headword:

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Relevant legal provisions:

EPC Art. 83

Relevant legal provisions (EPC 1973):

-

Keyword:

"Insufficiency of disclosure (yes)"

Decisions cited:

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Catchword:

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Case Number: T 1055/07 - 3.5.02

**DECISION
of the Technical Board of Appeal 3.5.02
of 13 January 2010**

Appellant: Broadcom Corporation
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Representative: Jehle, Volker Armin
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Decision under appeal: Decision of the Examining Division of the
European Patent Office posted
9 February 2007 refusing European patent
application No. 03018309.9 pursuant to
Article 97(1) EPC 1973.

Composition of the Board:

Chairman: M. Ruggiu
Members: R. Lord
E. Lachacinski

Summary of Facts and Submissions

- I. This is an appeal of the applicant against the decision of the examining division to refuse European patent application No. 03 018 309.9.

- II. In a communication dated 17 September 2009 accompanying a summons to oral proceedings the board informed the appellant *inter alia* that the issue of sufficiency of disclosure within the meaning of Article 83 EPC would possibly need to be discussed at the oral proceedings, since it was not apparent from the application as originally filed how in the sole detailed embodiment the 32-bit range of the data values could be reduced to only 16 possible values for the purpose of indexing.

With a reply to that communication, dated 14 December 2009, the appellant filed a replacement set of claims 1 to 12.

Oral proceedings were held before the board on 13 January 2010.

The appellant requested that the decision under appeal be set aside and that a patent be granted in the following version:

Description:

Pages 1, 3 to 10, 13 to 15 and 17 as originally filed, Page 2 filed with letter of 22 November 2005, Pages 11, 12 and 16 received during the oral proceedings of 13 January 2010.

Claims:

No. 1 to 12 filed with letter of 14 December 2009.

Drawings:

Sheets 1/4 to 4/4 as originally filed.

- III. Claim 1 as filed with the letter of 14 December 2009 reads as follows:

"A method to decimate an indexed set of data elements, said method comprising:

storing said indexed set of data elements in a memory module (110); said set of data elements being arranged in groups, each of said groups of data elements comprising at least two data elements; wherein each element of the indexed set of data elements is associated with an index value and a data value,

pipelining the groups of said at least two index values from said memory module (110) to an address line of a programmable memory device using at least one FIFO (120), each group of index values serving as an address to a programmable memory device (130);

generating a decimation look-up-table LUT using a host

processor, said host processor generating a decimated data value of the decimation look-up-table using a decimation algorithm, wherein the decimated data value is a function of the data values corresponding to the group of index values addressing the look-up-table;

storing said pre-programmed decimation look-up-table (LUT) in a programmable memory device (130),

outputting the decimated data value from said pre-programmed look-up-table for each group of index values addressing the decimation look-up-table."

Claim 8 as filed with the letter of 14 December 2009 reads as follows:

"A system for decimating an indexed set of data elements, said system comprising:

a memory module (110) for storing said indexed set of data elements; said set of data elements being arranged in groups, each of said groups of data elements comprising at least two data elements; wherein each element of the indexed set of data elements is associated with an index value and a data value,

at least one FIFO (120) for pipelining the groups of said at least two index values from said memory module (110) to an address line of a programmable memory device (130); each group of index values serving as an address to a programmable memory device (130);

the programmable memory device (130) for storing a pre-programmed decimation look-up-table (LUT), the programmable memory device being adapted to output a decimated data value for each group of index values; and

a host processor for generating said decimation look-up-table LUT in said programmable memory device, said host processor being adapted to generate the decimated data value of the decimation look-up-table using a decimation algorithm, wherein the decimated data value is a function of the data values corresponding to the group of index values addressing the look-up-table."

IV. The appellant essentially argued as follows:

The board's interpretation of the application as meaning that the index values represent the data values in a reduced form was incorrect. The index values actually merely identified the data elements, so could for example in the case of video data be pixel addresses. The passages in paragraphs [0049], [0050] and [0052] of the published application which appeared to contradict this were clearly incorrect, as was apparent from paragraphs [0056] and [0057]. Thus the data values to be used in generating the decimated data values in the look-up-table (LUT) were the data values of the pixels corresponding to the index values in the LUT addresses. As a consequence, the decimated data values in the LUT were generated afresh for each new frame of video data. The skilled person would therefore be able to identify the index values and to carry out the invention on the basis of the disclosure of the application.

The deletions carried out in the description pages filed during the oral proceedings removed discrepancies in the application and thus clarified the manner in which the invention was carried out. The description of the "pre-programming" in paragraphs [0064] and [0065] of the published application did not preclude the production of a new LUT for each frame, since the first of these paragraphs described only that the addressing structure for the desired decimation ratio is pre-programmed, and the second concerned only the location of the storage memory, not its content.

Reasons for the Decision

1. The appeal is admissible.
2. In the method of claim 1 according to the appellant's present request and the system of claim 8 of that request the index values of the data elements play a critical role, since it is the grouping of those index values and the use of the grouped index values to address the look-up-table (LUT) which provides the decimation function which is described as being the aim of the invention (see e.g. paragraphs [0008] and [0009] of the published application). However, the application provides no clear teaching which would enable the skilled person to be able to deduce how these index values should be generated. Thus the application does not disclose the claimed invention in a manner sufficiently clear and complete to meet the requirements of Article 83 EPC.
 - 2.1 The most detailed description in the original application concerning the nature of the index values was in paragraphs [0049] to [0052] of the published application. As described in the first of those paragraphs, "*[a]ssociated with each element of the indexed set of data elements is an index*

value and a data value". The following three paragraphs then describe a specific embodiment in which "each element in the indexed set of data elements may take on one of 16 possible data values and each possible data value has a unique index value (0x0 to 0xF in hex)" (paragraph [0050]), "[e]ach data value comprises a 32-bit word" (paragraph [0051]) and "[e]ach index value comprises 4 bits (corresponding to one of the 16 possible data values or colors)" (paragraph [0052]). From these passages it is apparent that the index values represent in some manner the corresponding data values, which conclusion is also consistent with the references to the "16 (original) possible data values" in each of paragraphs [0054] to [0056].

- 2.2 It is however also apparent that the range of colours represented by the 32-bit data values is extremely large (since 2^{32} is approximately 4 billion), whereas the 4-bit index values enable only 16 different colours to be expressed. Achieving such an enormous reduction in data range cannot be considered to form part of the common knowledge of the skilled person, and the application provides no teaching as to how the reduction should be carried out, either in terms of mechanism or purpose. In particular, the skilled person would recognise that the extreme reduction in the number of bits involved in this process would risk the loss of most of the information content in the incoming video data, but would, on the basis of the limited teaching of the application combined with his general knowledge, not be able to deduce how he should proceed in order to carry out that reduction in a workable manner.
- 2.3 The board therefore concludes that the application does not disclose the claimed invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art, so that the application does not meet the requirements of Article 83 EPC.
3. The above conclusion is not affected by the appellant's counter-arguments or the amendments to the description introduced in his current request, for the following reasons.
 - 3.1 The appellant did not present any arguments concerning the question of how the data reduction discussed above could be achieved. Instead he argued that the interpretation of the relationship between the index values and the data values underlying the board's objection was incorrect, so that this question did not arise. Specifically, he argued that the index values were actually merely identifiers for the data elements (e.g. for the case of video data, the index value of a data element could simply be the corresponding pixel address), so that the only link between the index value and the data value of a data element is the indirect one that they are part of the same data element. He argued on this basis that it was entirely clear to the skilled person how

to generate the index values, and that the decimated data value entries in the LUT should then be generated from the data values corresponding to the index values addressing that LUT (e.g. by averaging them, as described in the application). In this context he acknowledged that, since the data values generally changed with every frame of video pixel data, this interpretation requires that the decimated data values in the LUT be recalculated for each new video frame.

- 3.2 The board considers that the skilled person would not consider this interpretation of the application to be plausible, because it is in contradiction to all of the passages of the description referred to in paragraph 2.1 above (i.e. paragraphs [0049] to [0052] and [0054] to [0056]). Moreover, the recalculation of the decimated data values for each new video frame is not only inconsistent with the options described in paragraphs [0064] and [0065] of the published application (since that recalculation would be precluded if the memory was programmed before installation, and since the recalculation would require the actual data values to be available within the system), but is also not consistent with the concept of a look-up-table. This latter point arises because, in the decimation method as described by the appellant, the decimated data value for each group of index values would be calculated, stored in the memory, and then read out (exactly) once, so that the memory would in effect function as a buffer. The term "look-up-table" on the other hand implies that, after calculation and storage of the content of the table, any individual entry can be addressed and read any number of times, depending on the overall system behaviour, as would occur when, as discussed in paragraph 2.1 above, the index values depend directly on the data values. The use of the term "look-up-table" (or the abbreviation "LUT") throughout the application thus teaches away from the interpretation proposed by the appellant.
- 3.3 The appellant's argument that the pre-programming referred to in paragraph [0064] of the published application relates only to the structure and addresses of the LUT, and not to the decimated data values in the body of the table, is not found convincing, because the skilled person would consider the simultaneous programming of both of these parts of an LUT to be normal practice, and because the application contains no suggestion that this normal practice should not be followed. Additionally, the skilled person would note that this paragraph describes that the programmable memory can be an EEPROM, and that the re-programming of such a memory during the course of a high-speed calculation such as video data processing would be extremely unusual.
- 3.4 Similarly the appellant's argument that the different storage location for the data values of the video data described in paragraph [0065] of the published application

would not preclude the recalculation of the LUT for each new frame is not found convincing, again because the high-speed calculations involved in video data processing would require direct access to that data, so that it could not be stored outside the system.

- 3.5 The deletion of three passages of the description (corresponding to paragraphs [0050] and [0064] and part of paragraph [0052] of the published application) as introduced in the amended pages filed during the oral proceedings before the board obviously cannot address the objection of section 2 above, since such a deletion cannot have any effect on an objection of insufficient disclosure. Moreover, it does not affect the conclusion of paragraph 3.2 above, since that was not based only on those passages.
4. Since the appellant's sole request is not allowable because it does not meet the requirements of Article 83 EPC, the appeal has to be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

U. Bultmann

M. Ruggiu