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Datasheet for the decision
of 22 July 2010

Case Number:	T 1019/07 - 3.4.03
Application Number:	01948546.5
Publication Number:	1295515
IPC:	H05B 37/02
Language of the proceedings:	EN

Title of invention:
Method and apparatus for controlling a lighting system in
response to an audio input

Applicant:
Philips Solid-State Lighting Solutions, Inc.

Opponent:
-

Headword:
-

Relevant legal provisions:
-

Relevant legal provisions (EPC 1973):
EPC Art. 54, 56, 111(1), 113(1), 114(1)

Keyword:
"Novelty (yes)"
"Inventive step (yes)"
"Reimbursement of the appeal fee (no)"
"Remittal for further prosecution"

Decisions cited:
-

Catchword:
–

Case Number: T 1019/07 - 3.4.03

D E C I S I O N
of the Technical Board of Appeal 3.4.03
of 22 July 2010

Appellant:	Philips Solid-State Lighting Solutions, Inc. 3 Burlington Woods Burlington, MA 01803 (US)
Representative:	Bekkers, Joost J.J. Philips Intellectual Property & Standards P.O. Box 220 NL-5600 AE Eindhoven (NL)
Decision under appeal:	Decision of the Examining Division of the European Patent Office posted 21 December 2006 refusing European patent application No. 01948546.5 pursuant to Article 97(1) EPC 1973.

Composition of the Board:

Chairman: G. Eliasson
Members: V. L. P. Frank
               P. Mühlens

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Summary of Facts and Submissions

I.   This is an appeal from the refusal of application
        01 948 546 for the reason that the subject-matter of
        claim 1 lacked novelty (Article 54 EPC 1973).

II.   At oral proceedings before the board, the appellant
        applicant requested that the decision under appeal be
        set aside and that a patent be granted on the basis of
        claim 1 of the new main request filed in the oral
        proceedings, and that the appeal fee be reimbursed.

III.   The independent claim of this request reads as follows:

        "1.   An apparatus for executing a lighting program to
              control a plurality of light emitting diodes (LEDs)
              (40), the apparatus comprising:
              a mapping table (2015t) to store a plurality of
              lighting programs;
              an input to receive an audio signal (2003, 2005)
              in a digital format;
              an audio decoder (2011) to digitally process the
              audio signal (2003, 2005) to determine and output
              at least one characteristic of the audio signal,
              wherein the audio decoder (2011) is configured to
              determine a beat of the signal based upon pulses
              within particular frequency bands of the audio
              signal, and the at least one characteristic of the
              audio signal relates to the beat; and
              a mapper (2015), coupled to the audio decoder
              (2011) and to the mapping table (2015t),
              configured to execute a lighting program stored in
              the mapping table (2015t), to perform a mapping
              function from the at least one characteristic of

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the audio signal to generate control signals to
control the plurality of LEDs;
wherein the lighting program includes one or more
variable parameters that affect intensity and/or
color of a lighting effect generated by the
plurality of LEDs (40) in response to the control
signals, and wherein
the mapper (2015) is configured, during the
execution of the lighting program, to receive the
output of the audio decoder (2011) to provide
input values for the one or more variable
parameters, to change the mapping function in
response to the output received from the audio
decoder (2011) and to generate the control signals
based on the determined at least one
characteristic of the audio signal."

IV.   The following prior art documents are cited in this
      decision:

      D1: EP 0 942 631 A

      D11: GB 2 354 602 A

V.   The examining division argued essentially as follows:

      —   The examination division recognized that although
          there were differences in terminology between
          document D11 and the apparatus defined by claim 1,
          these differences were not due to substantial
          technical differences. The apparatus defined by
          claim 1 had the same input (a digital audio signal)
          and the same output (control signals for lighting
          devices) as the apparatus of document D11 and the

result was the same in both cases, namely a light
show responsive to several aspects of the digital
audio input signal (e.g. beat and amplitude in
different frequency bands). From comparing figure 8
of the application with figure 1 of D11, it followed
that in D11 the computer and its software comprised
all the features of the mapper and most of the
features of the audio decoder (in D11 the input
device was external to the computer), but as all
functionality of the mapper and audio decoder could
easily be implemented in software or hardware or a
combination thereof, it was not essential how the
different functional blocks were schematically
subdivided.

VI.   The appellant applicant argued essentially as follows:

    —   In accordance with claim 1, the lighting program
         executed by the mapper was one of a plurality of
         lighting programs stored in a mapping table and
         included at least one variable parameter that
         affected an aspect of the lighting effect generated
         by the LEDs, the mapper being configured to provide
         input values for the at least one variable during
         execution of the lighting program based on a beat of
         the audio signal determined based upon pulses with
         particular frequency bands and received from the
         audio decoder during the execution of the lighting
         program.

    —   It was thus clear that the one or more variable
         parameters were included in the executable lighting
         program itself and that the input values were not
         provided before the execution of the one program

started. Also, the input values could not be
provided before the program had been selected
amongst the plurality of programs stored in the
table, i.e. the input values of claim 1 were not
used in the selection, but for varying a program
already selected and being executed. The provision
of input values for one or more variable parameters
of a lighting program being executed did not equal
with a selection of a lighting program (or a part or
module thereof) for execution, regardless the
criteria based on which such selection might be done.
Instead, in the present invention a lighting program
including the required parameters had already been
selected amongst the plurality of programs in the
mapping table and the execution of the program had
already been started by the mapper at the time when
the provision of the input parameters for the
variable parameters in the program took place based
on the beat information received during the
execution of the program.

−   Figure 3 of Dl1 showed that the output of a timing
     analyser formed timing bus 25. As shown in Figure 4,
     the timing bus 25 and control bus 26 were fed to an
     act selector 30 to provide a means of selection of
     an act 31. The control bus 26 provided act selection
     instructions and the timing bus 25 provided timing
     information which was correlated by the act selector
     30 with the act selection instructions from the
     control bus 26 to ensure that act selection was
     effected in time with the BPM or time indicator of
     audio sources. Although in Dl1 the timing analyser
     20.1 could calculate a beat per minute (BPM) by
     analysing triggers in data bus 10 or analysing the

information in spectral data bus 6, there was no
direct and unambiguous disclosure that the BPM
information was determined based on pulses within
particular frequency bands, and even more
importantly, that the BPM information was used to
provide input values for at least one variable
parameter of a lighting program from a mapping table
during execution thereof and after the program had
already been selected from the table. Instead, Dl1
gave a clear teaching of a selection of an act from
a list of preset acts where the timing information
could be used to synchronise the selection in time.
However, Dl1 did not disclose or even suggest that
the act selector would be configured to receive an
output of an audio decoder during execution of a
lighting program to provide input values for one or
more variable parameters of the executable lighting
program that affected an aspect of a lighting effect
to generate control signals based on a determined
beat of an audio signal during the execution of the
already started lighting program. Instead, in Dl1
synchronisation of the selection of an act could be
provided based on the timing information during
generation of the program. It should be appreciated
that the output of the act selection did not result
in executable code, but several further stages of
selection functions was still needed until the final
stage of mood selection, and it was only after the
final stage of mood selection when the execution of
the generated lighting program could be started.
Therefore Dl1 did not provide any explicit or
implicit disclosure of a mapper providing input
values for any parameters of the acts during
execution of a selected act, as the execution could

only start after the algorithm had gone through the
different functional levels to create a program to
be executed.

—   Starting from Dl1, therefore, the current invention
    solved the problem of complexity in programming and
    achieving varying lighting effects based on audio
    input in a flexible manner. The present invention
    overcame the inconvenience of D11 based on the
    realisation that each lighting program stored in a
    mapping table did have variable parameters, and
    therefore an aspect of a lighting effect could be
    affected during the execution of the already
    selected lighting program by generation of input
    values for the one or more variable parameters based
    on the determined beat of the audio signal, thus
    avoiding the multistep compiling arrangement
    progressing from a selection on the highest level to
    further selections on the lower levels before
    obtaining the ultimate program as suggested by D11.

—   The applicant also requested reimbursement of the
    appeal fee on the ground that the Examining Division
    made a substantial procedural violation in rejecting
    the main and first auxiliary requests.

—   Document D11 was cited by the examining division
    only 24 hours before the oral proceedings. The
    representative received it in the lounge at Heathrow
    airport on 10 October 2006. Mr. B. of the
    applicant's company was already flying across the
    Atlantic Ocean to attend the oral proceedings so it
    was not feasible to request postponement of the oral
    proceedings. The reason given by the examining

division justifying the late citation was submitted
not to be correct because the amendments made on
5 October 2006 did not materially affect the
patentability of the inventions claimed - they were
addressing the many formal objections raised that
were then not subsequently raised at the oral
proceedings. Given the late citation of D11, the
examining division had a heightened duty to rely on
it properly, ie correctly to construe both the
teaching of D11 and the claims of the application.
This was not done. The applicant believed that the
examining division convinced itself that the
document was novelty destroying because it had found
and cited it only a day before the oral proceedings,
with the result that the examining division then
failed properly to consider the submissions of the
applicant made at the oral proceedings concerning
the proper objective scope of both the claims of the
present application and the actual disclosure of D11.
Moreover, the discussions at the oral proceedings
did not correlate to the grounds for the decision,
contrary to Article 113 EPC. Still further, the
comment of the chairman in paragraph 2.12 of the
Minutes summarised the substantial procedural
violation — the Examining Division looked at
"functionalities" and failed to consider the claim
language and the actual objective disclosure of D11
properly, and repudiated the need for a problem-
solution approach to inventive step.

Reasons for the Decision

1.   The appeal is admissible.

2.   *Claim 1*

2.1   The examining division refused the application for the
        reason that the subject-matter of claim 1 lacked
        novelty over document D11. This document, however,
        discloses an apparatus for executing a lightning
        program to control a plurality of lighting devices 62
        without specifying the nature of the light sources of
        the lighting devices (page 11, lines 3 to 12; Figure 1).
        Claim 1 on the other hand specifies that the apparatus
        controls a plurality of light emitting diodes (LEDs).

        Notwithstanding any possible further differences
        between the subject-matter of claim 1 and that of D11,
        it has to be concluded that the apparatus according to
        claim 1 is new over D11 for this sole reason.

2.2   The apparatus of claim 1 is based on the embodiment of
        Figure 8, starting on page 32 "Controlling lightning
        systems in response to an audio input".

        As disclosed there, the audio decoder 2011 can be
        implemented in hardware or software (page 35, lines 1
        to 3). This is also true for many other components of
        the apparatus and, since this also applies to the
        apparatus of D11 (see Figure 1, computer 70 and
        software 80), a precise identification between the
        functional groups of the claim and those of the prior
        art is not always straightforward. Different names are
        used for software subroutines performing essentially

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the same task and the various tasks are grouped and
divided differently between different subroutines. This
was also recognized by the examining division (reasons,
point 2.1.3 of the appealed decision).

2.3   In D11 the input device 3 is connected to input data
        bus 4 which is fed to the audio analysing section 5 of
        the software system 80. The input device 3 may have
        analog or digital data audio inputs (page 5, lines 21
        to 30; Figure 1 and 2). The input device 3 and the
        audio analysing section 5 thus correspond to the input
        to receive an audio signal (2003, 2005) and to the
        audio decoder (2011) of claim 1, respectively.

2.4   The data from the input data bus 2 are analysed by a
        Fast Fourier Transform (FFT) spectral analyser and form
        the spectral data bus 6 (paragraph bridging pages 5 and
        6). The spectral data bus 6 is passed to a plurality of
        trigger channels 7 which monitor specific frequency
        bands of the audio information and create triggers
        according to the function & parameter control 7.1
        settings (page 6, lines 3 to 8; Figure 2). These
        triggers form data bus 10 which is analysed by timing
        analyser 20.1 to provide timing information to timing
        bus 25 (page 6, lines 31 to 32; Figure 3). The timing
        analyser 20.1 calculates *inter alia* the Beats per
        Minute (BPM) by analysing the triggers in data bus 10.
        Alternatively, the information in spectral data bus 6
        can be used to calculate BPM (page 7, lines 1 to 4).
        The timing signals on the timing bus permit to maintain
        the synchronicity with the audio signals.

2.5   The appellant applicant argued that the audio decoder's
        output into the mapper (ie the input values for the one

or more variable parameters that affect the lightning
effect generated by the LEDs) related to the beat of
the input audio signal, the beat being based upon
pulses within particular frequency bands of the audio
signal and that this feature was not disclosed in D11.

2.6   The board considers however that the beat of the audio
        signal is determined in D11 from the frequency domain
        intensity distribution supplied by the FFT. This
        distribution is supplied as intensity vs. frequency and
        grouped in corresponding frequency bands. The
        specification in claim 1 that "particular" bands are
        used for determining the beat of the signal is not a
        differentiating feature, since not all frequency bands
        are relevant for determining the beat (high frequency
        components are eg completely irrelevant for determining
        the beat) and a skilled person understands that only
        the relevant frequency bands are used in D11 for
        determining the beat.

        The board concludes for these reasons that the features
        of the audio decoder 2011 of claim 1 are implicitly
        disclosed in D11.

2.7   Although the functional groups of D11 which correspond
        to the mapping table and to the mapper have not yet
        been identified, D11 discloses in the wording of
        claim 1:

        An apparatus for executing a lighting program to
        control a plurality of lighting devices 62, the
        apparatus comprising:

an input 3 to receive an audio signal 1 in a digital format and

an audio decoder 5 to digitally process the audio signal to determine and output at least one characteristic of the audio signal, wherein the audio decoder is configured to determine a beat of the signal based upon pulses within particular frequency bands of the audio signal, and the at least one characteristic of the audio signal relates to the beat.

Let's turn now to the mapper and the mapping table.

2.8   According to claim 1, the mapper 2015 is coupled to the audio decoder 2011 and to the mapping table 2015t. The mapping table stores a plurality of lighting programs, one of it being executed by the mapper. The lighting programs include variable parameters affecting the intensity and/or color of a lighting effect generated by the LEDs.

The mapper

(a)   performs a mapping function from the characteristic of the audio signal provided by the audio decoder (ie at least a signal relating to the beat) to generate control signals for the plurality of LEDs,

(b)   generates from the output of the audio decoder input values for the variable parameters of the lighting program, and

(c)   changes the mapping function in response to the
       output of the audio decoder.

The mapper has thus three roles once the lightning
program to be executed has been selected.

2.9   According to D11, the lighting program is defined at
         different operational levels which are named
         sequentially "performance", "act", "scene" and "mood".
         The first and highest level of operational control is
         the "performance" 20 (page 6, lines 26 to 28; Figure 3).
         The stored "performances" 20(1), 20(2), …, 20(n) can be
         equated to the mapping table of claim 1 which is
         defined as storing a plurality of lighting programs, in
         the case of D11 the "performances".

2.9.1   At the next hierarchical level of operation, the "act"
         31, a plurality of texture detectors 31.1 and scene
         arrangers 35 arrange the next level of operation, the
         "scene" 41. The acts 31 create scene selection
         instructions in two ways based on data supplied by
         timing bus 25 and data bus 10 (page 8, lines 7 to 18;
         Figure 4).

2.9.2   The first method operates as follows: scene selectors
         35 contains a list of available scenes 41 and a time
         scale against which certain scenes 41 may be instructed
         to apply. The period of time over which scenes 41 are
         selected by scene arranger 35 is measured in units
         directly related to BPM or time signature of audio
         sources 1 as calculated by timing analyser 20.1 and
         supplied by timing bus 25. The result is a set of scene
         change instructions created by scene arranger 35 and

sent to scene bus 36, which are in time with the BPM of audio source 1 (page 8, lines 19 to 25).

2.9.3   The second method that acts 31 uses to create scene selection instructions is to **autonomously and automatically select scenes** according to the settings of texture detectors 31.1. Texture detectors 31.1 comprise a set of definable filters, functions and parameter settings that may be used to identify certain aspects of audio sources including eg beats, treble, middle or specific audio band activity, silence, crescendos or other musical nuances, and specific patterns or instrument characteristics (page 8, line 26 to page 9, line 3).

2.9.4   The next operational level comprises the "moods" 51 which are selected for each scene 41 by function & parameter controls 41.1 and mood arranger 41.2. Mood arranger 41.2 provides means for selecting, from a list of available options, which moods 51, are to be used for a particular scene 41, and sends mood selection instructions to mood bus 45. Function & parameter controls 41.1 provide a means of defining from a list of options, how a scene 41 will use the chosen moods. Examples of such options being: use a certain mood 51 every time scene 41(n) is applied, i.e. cycle, or use a certain mood 51 only the first time scene 41(n) is applied, i.e. one shot (page 9, lines 22 to 30; Figure 5).

2.9.5   Finally the "moods" 51 comprise function & parameter controls 51.1 and an output arranger 51.2 which provides means of arranging data to be sent to

lightning devices 62 via output bus 55, output devices 60 and connections 61 (page 10, lines 5 to 7; Figure 6).

2.10   The appellant applicant argued that in D11 any use of beat information from the audio signal was either employed to establish a clock on timing bus 25 or to determine scene selection, but was not employed to provide input values for variable parameters in any scene or mood program. Moreover, the lighting program consisted in synchronizing pre-defined functions with the beat of the audio signal, but had no versatility during the execution of the program.

2.11   The board considers that these arguments apply to the first method of act selection disclosed in D11 (point 2.9.2 discussed above). However, in the second method the scenes are selected **autonomously and automatically** according to the settings of texture detectors 31.1 (ibid point 2.9.3). The texture detectors identify certain aspects of the audio signal and on this basis it is decided which scenes and moods are employed. This decision on which scenes and moods are used cannot be done **autonomously and automatically,** ie without any human intervention, without using variable parameters whose input values are defined when the audio signal is analyzed by the texture detectors.

For these reasons, the boards judges that functions (a) and (b) of the mapper mentioned in point 2.7 are found in the apparatus of D11 at the level of act 31 in texture detector 31.1 and scene arranger 35, namely to perform a mapping function from the characteristic of the audio signal provided by the audio decoder to generate control signals for the plurality of LEDs, and

to generate from the output of the audio decoder input
values for the variable parameters of the lighting
program.

2.12   The apparatus of claim 1 therefore differs from the
        apparatus of D11 in that

        (i)   LEDs are used as lightning devices and that

        (ii) the mapper changes the mapping function in
              response to the output received from the audio
              decoder.

        Both features address different problems and may be
        treated separately.

2.13   Feature (i) addresses the issue of how to put in
        practice the teaching of D11 and involves the obvious
        solution of using LEDs; a technology which was
        available to the skilled person at the filing date of
        the application (see eg D1, [0015] and the present
        application, page 40, lines 8 to 10).

2.14   The board agrees with the appellant applicant that the
        objective problem addressed by feature (ii) can be
        formulated as how to increase the versatility of audio
        control of the lighting program. This problem was also
        addressed in the original application by stating that
        existing programs have limited functionality with
        respect to the visualization of music (page 6, lines 9
        to 10).

        The application discloses that the mapping function can
        be selected eg by including a variable in a single

mapping function that can result in changes of the
mapping output or by switching between different
mapping functions in the mapping table (page 38, lines
5 to 25).

2.15   As mentioned previously (point 2.9) the mapping table
of the present application can be equated to the set of
"performances" 20(1) … 20(n) of D11. The texture
detector 31.1 and the scene arranger 35 found at the
next operational level, the "act", fulfil the function
of the mapper by which input values are created from
the analysis of the audio signal for the variable
parameters of the lighting program, since at this level
the selection of "scenes" and "moods" is done
autonomously and automatically according to the
settings of texture detectors 31.1. However, no change
in the selected mapping function, neither in response
to an external or an internal signal is suggested. In
particular, the function & parameter controls 41.1 and
the mood arranger 41.2 select form a list of options
the moods to be used for a specific scene. These
options are illustrated in D11 as eg repeatedly using a
mood (cycling) or using a mood only once (one-shot)
(page 9, lines 22 to 30). These options, however, do
not change the mapping function, but maintain the same
mapping function being used.

Also the options available to the function & parameter
controls 51.1 and to the output arranger 51.2 at the
"mood" operational level do not include a change in the
mapping function, but are fixed functions that can be
used and combined when defining the particular mood,
but remain fixed after that (page 10, line 5 to page 11,
line 2; Figure 6).

Changing the mapping function during execution of a
lighting program therefore adds a further degree of
versatility to the apparatus for executing a lightning
program which is not derivable from the disclosure of
document D11 or from the other available prior art
documents.

2.16   Consequently, the board finds that the apparatus for
        executing a lightning program of claim 1 is new and
        involves an inventive step.

3.   *Reimbursement of the appeal fee*

3.1   The appellant argued that the examining division
        committed a substantial procedural violation in
        rejecting the main and first auxiliary requests at the
        oral proceedings before the examining division on the
        basis of document D11.

3.2   The minutes of the oral proceedings before the
        examining division state that document D11 was sent by
        fax on the morning of 10 October 2006, ie one day
        before the oral proceedings held on 11 October 2006
        (point 1.3.1). The appellant alleges that due to the
        late introduction of D11 he could not request
        postponement of the oral proceedings.

3.3   The board, however, cannot recognize that this request
        could not have been submitted at the oral proceedings,
        since according to the minutes (which the board assumes
        reproduce correctly the course of the oral proceedings,
        as they were not contested by the appellant) the
        chairman asked the representative whether he could

comment on D11 or whether he needed further time to consider it (point 1.3). Had the representative requested a postponement of the oral proceedings then and there, the examining division would have had the obligation to give a reasoned decision on this request. Absent such a request no procedural violation occurred by not allowing it.

3.4   According to the decision, the late introduction of document D11 was prompted by the applicant's submission three days before the appointed oral proceedings of five new requests claiming for the first time features taken from the description (decision under appeal, points 1.11 and 1.12).

The appellant applicant alleged that the new claim requests contained amendments that did not require the introduction of a new document, as they only addressed formal objections which were not addressed afterwards during the oral proceedings.

However, irrespective whether this assessment is correct or not, the examining division has the right and even the duty to introduce of its own motion at any time any facts, evidence and arguments it becomes aware of (Article 114(1) EPC), of course with due regard to the party's right to be heard (Article 113(1) EPC), ie by giving the parties the time required for addressing these facts, evidence and arguments.

3.5   The appellant further argues that the examining division did not construe correctly the teaching of D11 and that of the claims. However, an incorrect interpretation of the claims or of the state of the art,

if such misinterpretation occurred, does not constitute
a procedural violation, but is an error of judgement.

3.6   Although the comments at point 2.12 of the minutes
        conflating the concepts of novelty and inventive step
        may be disputable, that at worst may reflect an error
        of judgement, but does not constitute a procedural
        violation. These statements, moreover, may be
        understood as meaning that the examining division did
        not recognize any substantial difference between the
        claims and the state of the art and, if there were any
        minor differences, they did not involve an inventive
        step.

3.7   Finally, the appellant alleges that the discussion at
        the oral proceedings did not correlate to the grounds
        for the decision and that, therefore, his right to be
        heard was violated. It is the established case law of
        the boards that a violation of the right to be heard is
        a substantial procedural violation. However, an
        unsubstantiated allegation without specifying the facts
        how this right was violated does not allow the board to
        decide in the appellant's favour.

3.8   The board judges, for these reasons, that, since the
        appellant has not shown the occurrence of a substantial
        procedural violation, the request for reimbursement of
        the appeal fee is refused.

4.   The board has addressed the reason for refusing the
        present application, ie lack of novelty and
        inventiveness of the apparatus of claim 1. It still
        remains to be assessed whether the dependent claims are
        consistent with amended claim 1 and to adapt the

description to the claims. The board uses therefore the
discretion conferred to it by Article 111(1) EPC and
decides to remit the case to the department of first
instance for further prosecution.

Order

For these reasons it is decided that:

1.   The decision under appeal is set aside.

2.   The case is remitted to the department of first
        instance for further prosecution.

3.   The request for reimbursement of the appeal fee is
        refused.

Registrar   Chair

T. Buschek   G. Eliasson