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**Datasheet for the decision
of 8 December 2020**

Case Number: T 1355/16 - 3.5.02

Application Number: 14157603.3

Publication Number: 2775602

IPC: H02M3/335, H02M3/156

Language of the proceedings: EN

Title of invention:

Techniques for controlling a power converter using multiple controllers

Applicant:

Power Integrations, Inc.

Relevant legal provisions:

EPC Art. 84, 54

EPC R. 103(1)(a)

Keyword:

Claims - clarity - main request, auxiliary requests 1 & 2 (no)

Novelty - auxiliary requests 3 to 5 (no)

Reimbursement of appeal fee - (no)



Beschwerdekammern

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Case Number: T 1355/16 - 3.5.02

D E C I S I O N
of Technical Board of Appeal 3.5.02
of 8 December 2020

Appellant: Power Integrations, Inc.
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Decision under appeal: **Decision of the Examining Division of the
European Patent Office posted on 2 February 2016
refusing European patent application No.
14157603.3 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman R. Lord
Members: G. Flynn
R. Cramer

Summary of Facts and Submissions

- I. The applicant's appeal contests the examining division's decision to refuse the European patent application 14 157 603.3, published as EP 2 775 602.
- II. In the contested decision the examining division found that the application did not meet the requirements of Article 52(1) EPC because the subject-matter of claim 1 of the then main request was not new within the meaning of Article 54(1) and (2) EPC, as it lacked novelty over each of the prior art documents:
- D1** - DE 10 2011 081 719 A1; and
- D2** - WO 2009/066273 A1.

The examining division came to this conclusion having disregarded the following features of main request claim 1 for the novelty assessment:

- (i) *"during a first mode of operation,... and during a second mode of operation";*
- (ii) *"according to a primary switching pattern defined by the primary controller";*
- (iii) *"to initiate a transition operation"; and*
- (iv) *"coupled to control".*

The examining division held these features to be unduly vague and, referring to the Guidelines for Examination [November 2015] F-IV,4.6, last sentence, held that they did not allow to clearly distinguish the claimed subject-matter from the prior art.

More particularly, the examining division characterised the features (i) to (iii) as being "hardly limitative"

and "non clearly distinguishing" and considered feature (iv) to be "not clearly distinguishing".

Despite their views on these features, the examining division did not see fit to raise an objection to them under Article 84 EPC for lack of clarity.

The examining division did not admit the first and second auxiliary requests into the procedure, holding it to be immediately apparent that they did not clearly overcome the objections raised for the main request.

III. With the statement setting out the grounds for appeal the appellant filed claim sets of a main request, a first auxiliary request and a second auxiliary request. In the grounds for appeal the appellant submitted in essence that:

- The right to be heard had been violated on several counts.
- The features of claim 1 were clear and technically limiting and should not have been "stripped away" for the assessment of novelty.
- The subject-matter of the claims of the main request was new and involved an inventive step.

IV. The Board summoned the appellant to oral proceedings, setting out their preliminary observations in a communication pursuant to Article 15(1) RPBA 2020 annexed to the summons.

In their observations the Board set out the reasons why they did not concur with the examining division's findings regarding the features (i) to (iii), but considered them to be clear and limiting on the claimed subject-matter.

The Board concurred with the examining division that the feature (iv) is not clear, but not for the same reasons. They explained that the features of claim 1 that the primary controller is coupled to control a/the state of the power switch attempted to define the claimed apparatus in terms of a coupling to the power switch, although neither the coupling nor the power switch formed part of the claimed subject-matter and that this rendered claim 1 unclear in the sense of Article 84 EPC.

The Board stated that they did not concur with the examining division's findings that claim 1 of the main request lacked novelty over document D1 or document D2 and set out their reasons for this.

The Board stated that document D3 - US 2004/120163 A1 could be more pertinent than D1 and D2, even though it was not relied upon in the contested decision. They explained that figure 1 of document D3 depicted in a single figure three known arrangements for controlling and driving the power switch 1112 of an isolated power converter. In the second arrangement described (see paragraphs [0010] and [0011]) two modes of operation seem to be combined: one mode which uses a start pulse generating circuit 1106 to set the switching pattern for the driving circuit 1102 of the power switch, and another mode which uses a PWM or PFM control circuit 1104 to set the switching pattern for driving circuit 1102 via a pulse transformer 1117 (communication link). The Board stated that this appeared to be rather similar to what was claimed, even if there was no specific disclosure in D3 of how the transition from the starting mode to the PWM mode was initiated. The Board stated that in view of this it might be appropriate to remit the case for further examination.

- V. With a letter of 9 November 2020 the appellant filed claims of third to fifth auxiliary requests. The appellant maintained that their right to be heard had been violated at first-instance and stated that the third to fifth auxiliary requests responded to the Board's new objection under Article 84 EPC. Considering the Board's observations in respect of document D3 the appellant requested that the Board reach a final decision without remittal.
- VI. Oral proceedings were held on 8 December 2020 as scheduled. The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the claims of the main request or of one of the first or second auxiliary requests, all filed with the statement of grounds of appeal, or of one of the third to fifth auxiliary requests filed with the letter of 9 November 2020. Further the appellant requested reimbursement of the appeal fee.
- VII. Independent claim 1 of the **main request** reads as follows:
- "1. A power converter controller comprising:
a primary controller (118, 218, 986) to be coupled to a power switch (122, 222, 996) of a power converter, wherein the primary controller is coupled to control a state of the power switch during a first mode of operation according to a primary switching pattern defined by the primary controller, and wherein the primary controller is coupled to control the state of the power switch in response to control signals received via a communication link during a second mode of operation; and*

a secondary controller (120, 220, 987) that is galvanically isolated from the primary controller, wherein the secondary controller is coupled to initiate a transition operation with the primary controller during the first mode of operation, wherein the transition operation transitions the primary controller and the secondary controller from the first mode of operation to the second mode of operation, and wherein the secondary controller is coupled to transmit the control signals to the primary controller via the communication link during the second mode of operation."

In the **first and second auxiliary requests** independent claim 1 is based on that of the main request, but with various features relating to the switching of the power switch added.

Independent claim 1 of the **third auxiliary request** is based on the independent method claim 16 of the main request and reads as follows:

"1. A method for controlling a power converter, the method comprising:

controlling (304) a state of a power switch on a primary side of the power converter during a first mode of operation according to a primary switching pattern, wherein the primary switching pattern is defined by circuits on the primary side of the power converter;

transitioning from the first mode of operation to a second mode of operation, wherein transitioning comprises transmitting (404) one or more control signals from a secondary side of the power converter to the primary side;

transmitting (412) control signals from the secondary side of the power converter to the

*primary side during the second mode of operation;
and*

*controlling (310, 312) the state of the power
switch in response to control signals received from
the secondary side during the second mode of
operation."*

In the **fourth** and **fifth auxiliary requests** independent claim 1 is based on that of the third auxiliary request, but with various features added as in the first and second auxiliary requests.

VIII. The appellant's submissions may be summarised as follows:

- The appellant maintains that reimbursement of the appeal fee is equitable as their right to be heard was violated at first-instance.
- Regarding the clarity objection raised by the Board in respect of the main and first and second auxiliary requests, the appellant submits that this objection is overcome by the third to fifth auxiliary requests.
- Considering novelty in respect of document D3, the appellant submits that D3 does not disclose the claimed feature that transitioning comprises transmitting one or more control signals from a secondary side of the power converter to the primary side.

Reasons for the Decision

1. *Main Request, first and second auxiliary requests - Clarity, Article 84 EPC*

- 1.1 The Board concurs with the examining division that the feature (iv) is not clear, albeit not perhaps for the same reasons.
- 1.2 Claim 1 according to the main request and the first and second auxiliary requests is for a "power converter controller comprising a primary controller ... to be coupled to a power switch ... of a power converter" (emphasis added). According to this wording the power switch of the power converter does not form part of the claimed apparatus. It is merely referred to as a statement of intended use.

Bearing this in mind, the features of claim 1 that the primary controller is coupled to control a/the state of the power switch attempts to define the claimed apparatus in terms of a coupling to the power switch, although neither the coupling nor the power switch forms part of the claimed subject-matter. This renders claim 1 unclear in the sense of Article 84 EPC.

- 1.3 The appellant has not contested this finding.

2. *Third to fifth auxiliary requests -
Novelty, Article 54 EPC*

- 2.1 Document D3 (US 2004/120163 A1) concerns a switching power supply apparatus. In its related art statement from paragraph [0005] onwards it describes, with the help of figure 1, three known arrangements for controlling and driving the power switch (switching element 1112) of an isolated power converter.
- 2.2 In the second arrangement described (see "second route" - paragraphs [0010] and [0011]) a PWM or PFM control circuit 1104 (i.e. secondary controller) is provided on the secondary side of a transformer 1111. Its output is sent back to a driving circuit 1102 on the primary side to control the switching element 1112 (i.e. to set its switching pattern). The Board considers this to be a second mode of operation in the sense of the present invention.
- 2.3 In paragraph [0011] it is explained that with this construction the apparatus does not start up and it is necessary to provide a start pulse generating circuit 1106 on the primary side for starting up the apparatus. As can be seen from figure 1, the output of the start pulse generating circuit 1106 is sent to the driving circuit 1102 to control the switching pattern of the switching element 1112. The Board considers this to be a first mode of operation in the sense of the present invention.
- 2.4 The start pulse generating circuit 1106 and driving circuit 1102 form part of a controller on the primary side of the converter. After start-up, control signals are transmitted from the PWM or PFM control circuit 1104 on the secondary side of the power converter to

the primary side (see paragraph [0010]) and the converter transitions from the first, start-up mode of operation to the second mode of operation in which the state of the power switch 1112 is controlled by the driving circuit 1102 in response to the control signals received from the secondary side.

- 2.5 Claim 1 of the third to fifth auxiliary requests comprises the feature that transitioning comprises transmitting one or more control signals from a secondary side of the power converter to the primary side.
- 2.6 Although document D3 does not explicitly disclose that transitioning between the start-up mode described in paragraph [0011] to the mode described in paragraph [0010] "comprises" transmitting the output of the PWM/PFM to the primary side, the board considers this to be implicit. It is evident from paragraph [0011] that in the absence of the PWM/PFM output the apparatus has to be operating in the start-up mode. Only when the output of the PWM/PFM is transmitted back to the primary side can the apparatus operate in the mode described in paragraph [0010]. Thus, the Board considers it to be implicit that the transition from the first mode to the second involves, i.e. comprises, transmitting the output of the PWM/PFM to the primary side.
- 2.7 Thus, all of the features of method claim 1 of the third auxiliary request are known from document D3. The additional features in claim 1 of the fourth and fifth auxiliary requests are also known from D3. That is not contested by the appellant. The requirements for novelty, Article 54 EPC are thus not met.

3. *Reimbursement of the appeal fee, Rule 103(1)(a) EPC*

3.1 According to Rule 103(1)(a) EPC "[t]he appeal fee shall be reimbursed in full ... where the Board of Appeal deems an appeal to be allowable, if such reimbursement is equitable by reason of a substantial procedural violation".

3.2 For the reasons set out above, the Board does not consider the appeal to be allowable. Thus, irrespective of whether or not a substantial procedural violation occurred, the conditions for reimbursement of the appeal fee are not met.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:



U. Bultmann

R. Lord

Decision electronically authenticated