

**Internal distribution code:**

- (A) [ - ] Publication in OJ
- (B) [ - ] To Chairmen and Members
- (C) [ - ] To Chairmen
- (D) [ X ] No distribution

**Datasheet for the decision  
of 5 March 2021**

**Case Number:** T 2130/17 - 3.5.05

**Application Number:** 13726325.7

**Publication Number:** 2845078

**IPC:** G06F3/041, G06F3/044

**Language of the proceedings:** EN

**Title of invention:**

CAPACITANCE TOUCH NEAR FIELD-FAR FIELD SWITCHING

**Applicant:**

Apple Inc.

**Headword:**

CAPACITANCE TOUCH NEAR FIELD-FAR FIELD SWITCHING / Apple

**Relevant legal provisions:**

EPC Art. 56

**Keyword:**

Inventive step - main request (no)  
Inventive step - auxiliary request (yes) - non-obvious  
combination of known features



**Beschwerdekammern**

**Boards of Appeal**

**Chambres de recours**

Boards of Appeal of the  
European Patent Office  
Richard-Reitzner-Allee 8  
85540 Haar  
GERMANY  
Tel. +49 (0)89 2399-0  
Fax +49 (0)89 2399-4465

**Case Number:** T 2130/17 - 3.5.05

**D E C I S I O N**  
**of Technical Board of Appeal 3.5.05**  
**of 5 March 2021**

**Appellant:**  
(Applicant)

Apple Inc.  
One Apple Park Way  
Cupertino CA 95014 (US)

**Representative:**

Lang, Johannes  
Bardehle Pagenberg Partnerschaft mbB  
Patentanwälte, Rechtsanwälte  
Prinzregentenplatz 7  
81675 München (DE)

**Decision under appeal:**

**Decision of the Examining Division of the  
European Patent Office posted on 3 May 2017  
refusing European patent application No.  
13726325.7 pursuant to Article 97(2) EPC.**

**Composition of the Board:**

**Chair** A. Ritzka  
**Members:** N. H. Uhlmann  
E. Mille

## **Summary of Facts and Submissions**

- I. The appeal is against the decision of the examining division refusing European patent application No. 13726325.7, which was filed on 29 April 2013.
- II. The examining division decided that the main request and auxiliary requests I to V did not satisfy the requirements of Article 56 EPC and made reference, *inter alia*, to the following documents:
- D1 US 2011/234523  
D8 US 2011/007021  
D10 US 2011/061949  
D13 US 2004/239650
- III. In its statement setting out the grounds of appeal, the appellant resubmitted the main request and auxiliary requests I to III on which the decision under appeal was based.
- IV. The board summoned the appellant to oral proceedings.
- V. In a communication pursuant to Article 15(1) RPBA 2020, the board set out its provisional view of the case.
- VI. With a letter dated 5 February 2021 the appellant submitted an amended main request, amended auxiliary requests I and III and comments on the provisional view of the board.
- VII. In the course of the oral proceedings the appellant submitted a new main request and a new auxiliary request which replaced all previous requests on file.
- VIII. The appellant's final request was that the decision under appeal be set aside and a patent be granted on the basis of the new main request or, alternatively, of

the new auxiliary request submitted by the appellant during the oral proceedings before the board.

IX. Claim 1 of the new main request reads:

"A method for switching a touch sensor panel between a self-capacitance configuration and a mutual capacitance configuration, the method comprising:

configuring a first set of multiple lines as sense electrodes in a self-capacitance configuration by applying a first stimulation signal to the first set of multiple lines through the non-inverting input of one or more operational amplifiers and as drive lines in a mutual capacitance configuration;

configuring a second set of multiple lines as sense electrodes in a self-capacitance configuration and a mutual capacitance configuration."

X. Claim 1 of the new auxiliary request reads:

"A method for switching a touch sensor panel between a self-capacitance configuration and a mutual capacitance configuration, the method comprising:

configuring a first set of multiple lines as sense electrodes in a self-capacitance configuration by applying a first stimulation signal to the first set of multiple lines through the non-inverting input of one or more operational amplifiers and as drive lines in a mutual capacitance configuration;

configuring a second set of multiple lines as sense electrodes in a self-capacitance configuration and a mutual capacitance configuration; and

applying, in the self-capacitance mode, the first stimulation signal to an electrode trace shield

encapsulating the first and second set of multiple lines."

- XI. The new auxiliary request comprises as further independent claims: claim 6 directed to a touch controller and claim 12 directed to a computing device.

### **Reasons for the Decision**

1. The present application pertains to a method for operating a touch sensor panel. The panel can be switched between a self-capacitance configuration (also called far-field architecture) and a mutual-capacitance configuration (called near-field architecture). In the self-capacitance configuration, a stimulation signal is applied to multiple conductive lines of the panel. Furthermore, a shield encapsulating the conductive lines is foreseen and connected to the stimulation signal or to a DC voltage.

2. Document D1 discloses a touch sensing system which can be switched between similar configurations.

3. Admissibility

The appellant filed the new main request and the new auxiliary request at the oral proceedings before the board, thereby replacing all previous requests.

These requests addressed, and overcame, objections raised by the board in the course of the oral proceedings. Furthermore, they were not detrimental to procedural economy and the board was in a position to deal with them without adjourning the oral proceedings.

For these reasons, the board admitted the requests into the proceedings.

## **New main request**

### 4. Patentability

- 4.1 It is common ground that document D1 forms a suitable starting point for a problem/solution analysis and the subject-matter of claim 1 is distinguished from D1's teaching by the following feature (a):

"by applying a first stimulation signal to the first set of multiple lines through the non-inverting input of one or more operational amplifiers".

- 4.2 The appellant submitted in the statement setting out the grounds of appeal that "the technical problem should be seen in how to improve the self-capacitance mode of the switchable touch sensor panel of document D1".

The board notes that the application as originally filed does not point out any technical effect caused by distinguishing feature (a). Furthermore, document D1 does not disclose implementation details of the sensing unit 120b used for the self-capacitance mode. Hence, the board considers that the technical problem to be solved may be formulated as "how to provide a basic implementation of the self-capacitance mode of the switchable touch sensor panel in document D1".

- 4.3 The appellant argued that the skilled person would not have used document D10 because it taught "a switching that differs from the switching between the mutual capacitance or near-field architecture to a self-capacitance or far-field architecture".

The board is not convinced. First, the claims do not exclude the temporary role of D10's stray capacitance mode. Second, they do not refer to any near-field or far-field architecture or any other aspects of detecting user inputs. Finally, in D10 the stray

capacitance mode is used for measuring an effect of the body capacitance, which seems to correspond to the sensing of "changes in self-capacitance induced by a finger or object" (application in suit, paragraph 42).

- 4.4 D10 discloses (Figure 12 and paragraphs 80 to 85) that in the stray capacitance mode, a stimulation signal is applied to the sense lines. In particular, the stimulation signal  $V_{stm\_sc}$  is applied to the non-inverting input of the amplifier 1209 and, due to the negative feedback, the stimulation signal is also present on the inverting input and thus on the sense line (paragraph 80). This teaching corresponds to the distinguishing feature, in particular in view of paragraph 45 of the application in suit.
- 4.5 The use of a stimulation signal provides a useful implementation of the self-capacitance mode, hence the skilled person would be motivated to replace D1's sensing unit 120b by a plurality of circuits as disclosed in Figure 12 of D10. The replacement would not negatively influence the function of the sensing unit, because this circuit performs a sensing function as well (Figure 12 and paragraph 80, the output voltage  $V_{sc}$  is, among other things, a function of the stray capacitance  $C_{stray}$ ).
- 4.6 The appellant submitted further that document D10 referred to stray, i.e. parasitic, capacitance, which was caused by the hand of the user and which was an unwanted effect. Differently, claim 1 referred to self capacitance.

The board is not convinced by this argument. The basic physical principles of stray, parasitic and self capacitance are similar. Claim 1 does not include any features which could establish a difference between

stray capacitance and self capacitance. Hence, claim 1 encompasses sensing of stray capacitance.

- 4.7 For these reasons, the subject-matter of claim 1 of the new main request does not involve an inventive step.

#### **New auxiliary request**

##### 5. Amendments

The amendments in claim 1 are based on paragraphs 42 to 45 and 50 of the description and on Figures 3A and 3B. Hence, the requirements of Article 123(2) EPC are complied with.

##### 6. Clarity

The board holds that the claims as amended overcome the clarity objections set out in its communication under Article 15(1) RPBA 2020, section 9. Moreover, no further deficiencies are apparent.

##### 7. Patentability

###### 7.1 Distinguishing features

Document D1 does not disclose feature (a) (see section 4.1 above) and feature (b):

"applying, in the self-capacitance mode, the first stimulation signal to an electrode trace shield encapsulating the first and second set of multiple lines".

- 7.2 The appellant argued that the distinguishing features lead to the combined technical effect of attenuating or eliminating parasitic capacitive effects to improve the detection accuracy of proximity events, pointing to paragraph 50 of the description.

- 7.3 The board agrees that features (a) and (b) lead to a combined effect because, in the self-capacitance



configuration, the same stimulation signal is applied to both the first set of multiple lines and the electrode trace shield.

- 7.4 The objective technical problem to be solved is, accordingly, how to modify the teaching of document D1 such that the effect referred to in section 7.2 is achieved.
- 7.5 Document D10 discloses feature (a); however, it does not refer to any shielding. Document D8, from the same technical field, discloses shielding as in feature (b); however, it does not disclose any operational amplifier. None of the prior-art documents on file discloses the features (a) and (b) in combination.
- 7.6 Facing the objective technical problem, the skilled person would arrive at document D8 but would not be motivated to extract features from both documents D8 and D10 and add them to the disclosure of document D1. The need to combine the teaching of three independent documents indicates that the claimed solution of the combined objective technical problem involves an inventive step.
- 7.7 For these reasons, the subject-matter of claim 1 of the new auxiliary request involves an inventive step within the meaning of Article 56 EPC.
8. Similar observations apply to the other independent claims of the new auxiliary request. For the same reasons, the dependent claims involve an inventive step.

## Order

### For these reasons it is decided that:

The decision under appeal is set aside and the case is remitted to the first instance division with the order to grant a patent based on

- claims 1 to 12 of the new auxiliary request submitted by the appellant during the oral proceedings before the board,
- description and drawings to be adapted.

The Registrar:

The Chair:



K. Götz-Wein

A. Ritzka

Decision electronically authenticated