

Examiners' Report - Paper B 2008 (Electricity/Mechanics)

1. General considerations

This year's paper relates to a data input device for a computer, such as a joystick or a graphics tablet.

There are two cited pieces of prior art, D1 and D2.

D1 describes a conventional potentiometer (Fig. 1) as background information, herein referred to as D1/1, and a joystick (Fig. 2) herein referred to as D1/2, which works on the same principle as the potentiometer of D1/1. The joystick of D1/2 determines the position of an actuator.

D2 discloses a data input device for a computer in the form of a panel (Figs. 1a, 1b, 2). The panel can be used for inputting data, such as an answer to a computer based questionnaire or a drink selection for a vending machine. The device of D2 identifies which area of the panel is being pushed (e.g. by a finger or blunt stick actuator).

The application cites the prior art D1/2 (par. [004]) and identifies two accuracy problems with the joystick of D1/2 (par. [005]).

It was expected to amend claim 1 to overcome the objections made in the examiner's communication, whilst at the same time respecting the applicant's wishes to avoid an anticipated "work around" (see applicant's letter, second paragraph).

It was also expected to amend the dependent claims appropriately whilst respecting the wishes of the applicant to develop features of the second embodiment (see in particular applicant's letter, third par).

Lastly it was expected to provide a letter of reply to the European Patent Office setting out arguments in support of the claims. It is noted that a letter to the applicant is not expected in paper B.

2. Claims (50 marks)

An example set of amended claims is annexed to this report.

2.1 Independent Device Claim (35 marks)

In this year's paper, a single independent device claim was expected.

2.1.1 **Example solution**

The following claim is an example of a good independent claim. The underlined portions are the amendments to the original claim 1, references in square brackets [...] are to the basis of these amendments in the original application:

Data input device for a computer (1, 11, 21) comprising:

- a support (2, 12, 22);
- a resistive layer (6, 16, 26) which is arranged on the support (2, 12, 22) and which is connectable to a voltage supply;
- a movable actuator (4, 14, 24) comprising a conductive element (8, 18, 28) at one of its ends [description, par. 12, 17 and 18] for picking voltages off the resistive layer (6, 16, 26); and
- a processing unit (92) for converting the voltages into output signals for the computer which represent positions of the actuator, **characterised in that** the device further comprises means for alternately generating a first voltage distribution and a second voltage distribution on the resistive layer, said means being synchronised with the processing unit (92). [original claim 3]

The examiner objected to the original independent claim on the grounds of lack of novelty with respect to prior art item D1/2. The examiner furthermore objected to the original independent claim on the grounds of lack of novelty with respect to document D2.

The first set of underlined features (comprising a conductive element at one of its ends) establishes novelty over D2. Although document D2 discloses an input device for a computer which comprises a conductive element (208) for picking voltages off the resistive layer (par [010]), the conductive element is in the form of a conductive layer (208) and is not part of the actuator (204).

The second set of underlined features (means for alternately generating a first voltage distribution and a second voltage distribution on the resistive layer, said means being synchronised with the processing unit) establishes novelty over D1/2. The joystick of D1/2 is based on the principle of operation of the potentiometer of D1/1 (par. [004]), and therefore it is implicit that, as in D1/1 (par. [002]), constant voltages (-V, +V) are applied to the ends of the resistive layer (spiral formed continuous band) of the joystick of D1/2 (par. [005]). Consequently a single, constant voltage distribution is established along the band.

2.1.2 Inferior Solutions

Inferior solutions are considered to be those solutions which do not have all the elements of the example solution, are new and could be argued to be inventive, but which are less favourable for the applicant than the example solution since they offer a more limited scope of protection than the example solution and/or go against the applicant's wishes.

For example, a claim based on original claims 1 and 2 with an actuator comprising a conductive element at one of its ends is new and it could be argued that its subject-matter involves an inventive step. However since it is limited to a resistive layer which covers the entire support, it contradicts the applicant's wish (applicant's letter, second paragraph) to avoid the anticipated "work around" of a data input device having a plurality of discrete resistive layers arranged side by side on a support. A maximum of **17 marks** was available for such a claim.

The combination of original claims 1, 3, 4 and 5 (limited to the switching time periods t_1 , t_2 each being 0.01 seconds) is new and it could be argued that its subject-matter involves an inventive step, but the scope of protection achieved is very narrow. A maximum of **17 marks** was available for such a claim.

2.1.3 Unnecessary Limitations

Claims having unnecessary limitations are considered to be those claims which have all the elements of the example solution, but which are further limited by additional features.

Answer papers having a single independent device claim that excluded at least one embodiment of the invention were considered to have severe unnecessary limitations. Such claims lost **17 marks**. Examples are the combination of original claims 1 and 3, limited to a joystick.

Minor unnecessary limitations lost **3 marks** per feature. For example:
Claim 1 of the example solution, with the addition of any of the following :

- the contact pairs;
- the switch;
- the resistive layer being coated or glued.

2.1.4 Amendments not supported by the application as originally filed

Generally it is noted that some answer papers included terminology which was not found in the application as originally filed. This risked contravening Art. 123(2) EPC.

2.1.4.1 Art. 123(2), (3) Trap amendments.

Amendments which would not be recoverable in post grant proceedings, because the removal of a feature not originally disclosed would extend the scope of protection conferred, lost **20 marks**.

This year an example of such a trap amendment was an independent claim based on original claim 1 and characterised by comprising "a plurality of discrete resistive layers" (with or without the feature "arranged side by side"). There is no basis for this feature in the original application, it is only mentioned as an anticipated "work around" in the applicant's letter, and therefore the feature contravenes Art. 123(2) EPC. Removing the feature in later opposition proceedings would not be possible since the amendment would extend the scope of protection conferred by the claim, Art. 123(3) EPC, so inevitably the patent would be revoked.

2.1.4.2 Art. 123(2) non-trap amendments.

Amendments which added subject matter and so contravene Art.123(2) EPC, but which would be recoverable in post-grant proceedings (non-trap), lost **8 marks** per feature.

This year, many answer papers included generalisations of sets of features which were always associated in the original application, by omitting at least one of these associated features. The following examples were considered to contravene Art. 123(2) EPC (non-trap):

- A claim defining an actuator comprising a conductive element (but not defining that the element is located at one of the ends (or at an end) of the actuator) (-**8 marks**).
- A claim according to the example solution except that the means for alternately generating a first voltage distribution and a second voltage distribution are not defined as being synchronised with the processing unit (-**8 marks**).
- A claim including the features of original claim 4 but not including the features of original claim 3 (-**8 marks**).

However, the following examples are not considered to contravene Art. 123(2) EPC:

- The feature of an actuator comprising a conductive element located "at an end" or "at one end". (The description discloses "at one of its ends" but the "further" end which is implied by the use of plural "ends" in the description has no effect on the way the actuator operates and is nowhere described in the application, so it was considered justifiable to dispense with it in the amended claim 1).
- Using the term "coated" rather than "directly coated" in the claim.

- An inferior solution having a claim limited to a resistive layer covering the support (original claim 2) but not including the feature of the layer being continuous since this is considered to be implicit.

- Incorporating only a part of the features of original claim 4 into a new claim (e.g. only the contacts or only the switches) was marked as a minor unnecessary limitation. It is considered that it can be justified under Art. 123(2) EPC to split the features of original claim 4 since there is no technical association between the switches and the arrangement of the contacts. However, the resulting claim is still unnecessarily limited.

For the above examples, irrespective of whether any marks were deducted for the claims themselves under the section Art. 123(2), answer papers were expected to contain arguments to justify the claim wording in the letter of reply under the section "source of amendments", see part 3.2 of this report.

2.1.5 Claims Lacking Clarity

Claims having an ambiguous scope were considered to lack clarity. Up to **20 marks** in total were deducted for independent claims lacking clarity.

Claims considered to be very unclear lost **20 marks**. For example, claiming a desired effect as the characterising feature: "characterised in that the data input device is accurate" (-**20 marks**).

Claims considered to be unclear in a minor way lost **3 marks** for each minor clarity issue identified. For example:

The claim of the example solution with the addition of the relative expression "very short time period" from par. [016]. (- **3 marks**).

The claim of the example solution having an actuator comprising a conductive element which is additionally specified as being in contact with the resistive layer (- **3 marks**).

A further group of claims which were considered to be unclear in a minor way were those claims which attempted to express that the actuator comprises a conductive element in such an ambiguous way that it was not clear whether or not the conductive element was comprised in the actuator:

These claims define an actuator and/with/having a conductive element located at one of the ends of the actuator (but do not define that the actuator comprises the conductive element) (- **3 marks**).

2.1.6 Claims lacking Novelty

An independent device claim that was considered to lack novelty against any of the available prior art documents lost **20 marks**.

Examples are:

The combinations of the original claims stated in the examiner's communication as lacking novelty; e.g. with respect to D1: (original claims 1 and 6); (original claims 1 and 6 and 7); and with respect to D2: (original claims 1 and 2); (original claims 1 and 3); (original claims 1 and 4); (original claims 1 and 8).

The combination of original claims 1 and 3 with the addition of "short time periods" is considered to lack novelty with respect to D2. The time periods t_1 , t_2 disclosed in D2 (0.25 seconds), although longer than the time periods disclosed in the application (0.01 seconds) can equally well be considered to be "short" (-20 marks).

The combination of original claims 1 and 3 and characterised by the feature: "wherein the output signals can represent positions of the actuator when the actuator is being moved" is considered to be not new with respect to D2. If the actuator of D2 is moved, the output signals obtained also represent the position of the actuator (relative to the selection areas).

The combination of original claims 1 and 3 and clock. It is considered that a clock is directly and unambiguously derivable from D2 and therefore implicitly disclosed in D2. D2 discloses equal time periods of 0.25 seconds in the example for the time periods given in par. [010]. Furthermore in par. [011] it is disclosed that the switch and the processing unit are synchronised. Since the switching is time dependent and synchronised as claimed in original claim 3, it is considered that a clock of some kind must be present in the device disclosed in D2.

Claims having features explicitly disclosed in document D2 with the addition of a definition of a point of contact between the conductive element and the resistive layer risked lacking novelty with respect to D2.

2.1.7 Claims lacking Inventive Step

Independent device claims that were considered to lack inventive step lost **17 marks**.

For example, a claim combining the features of original claims 1 and 3 wherein the claim additionally attempted to define how the resistive layer is attached to the support risked lacking inventive step with respect to document D2 and the application of general knowledge.

2.1.8 Formal Matters

This year it was considered appropriate to present the amended independent claim in the two-part form in accordance with Rule 43 EPC. 1 mark was deducted for a missing or incorrect application of the two part form with respect to either prior art item D1/2 or D2. 1 mark was deducted where reference signs were missing from the independent claim.

2.2 Dependent Claims (15 marks)

2.2.1 General remarks

15 marks were available for dependent claims. Marks in this section were awarded for the content of the dependent claims per se and for the logic of the claim structure. Full marks were only awarded for dependent claims having correct back references to the claims from which they should have depended, and which did not contravene Art.123 EPC. For example a new claim developing the second embodiment of the application should refer back to a claim to a joystick (originally claim 6) and not to the data input device for a computer of claim 1.

2.2.2 Original claims

It was expected to retain any appropriate dependent claims from the originally filed claims (for the example solution these are original claims 2, 4, 5, 6, 7, 8).

2.2.3 Second embodiment of the joystick

In this year's paper, in the applicant's letter it is requested to develop dependent claims for the second embodiment of the joystick. There is a clear basis in paragraph [017] of the application for a new claim dependent on a claim to a joystick having the following three features in combination: "flat support", "telescopic actuator" comprising a "spring" which urges the contact element onto the resistive layer. **6 marks** in total were available for such a claim.

Many answer papers had dependent claims which split up the features "flat support", "telescopic actuator" with a "spring" in two or more dependent claims. In this case it was considered that the requirements of Art.123(2) EPC were contravened, consequently such dependent claims were awarded a maximum of **4 marks** in total. For example, there is no basis in the original application for a joystick having a flat support without the telescopic actuator comprising a spring or for a telescopic actuator without a spring.

2.2.4 Meaningful fall back position claims

Up to **3 marks** were available for answers having claims which developed new meaningful fall back positions.

For the example solution a claim to a graphics tablet and a claim defining selection zones printed on the resistive layer with conductive ink were considered to be useful fall back position claims.

It is noted that dependent claims which were not considered to provide a useful fallback position were not awarded marks. For example claiming the ball joint of a joystick, which is known per se from D1/2.

3. Argumentation (50 Marks)

3.1 General Remarks

Generally it was expected to provide well structured, clear and convincing arguments. This year, for the expected solution, arguments were not expected with respect to the item of prior art D1/1, since this was not referred to in the Art. 94(3) communication and was considered to be less relevant than the item of prior art D1/2.

Statements which did not relate to specific features of the claim and/or the prior art did not receive any marks. Furthermore merely listing features of a prior art document and then stating a conclusion relating to these features without providing any reasoning attracted few or no marks.

3.2 Source of Amendments (10 marks)

Answer papers were expected to identify the source(s) of amendment for each claim. If the passages cited explicitly support an amended claim, merely citing these passages correctly (e.g. by citing the paragraph number) was sufficient to obtain full marks. In all other cases supporting arguments were necessary in order to obtain full marks.

In the example solution, the amendment that the actuator comprised “a conductive element at one of its ends” was based on a separate passage for each embodiment (par. [012],[017] and [018]). For claims having this feature, a citation for each of these passages was expected.

Where answer papers include a new claim incorporating only part of the features of an original claim (e.g. from original claim 4, only claiming the switch but not the contacts), or where other features were generalised, then arguments justifying the generalisation/omission of features were expected, e.g. by using the three part essentiality test, Guidelines C VI 5.3.10.

3.3 **Novelty (4 marks)**

4 marks were available for argumentation relating to novelty of the independent claim with respect to documents D1 and D2.

It was sufficient to identify a feature of a claim that is clearly not present in a particular item of prior art in order to prove novelty of the claim with respect to that item.

For example: D1 does not disclose means for alternately generating a first voltage distribution and a second voltage distribution on the resistive layer. D2 does not disclose an actuator which comprises a conductive element at one of its ends for picking voltages off the resistive layer.

3.4 **Inventive Step (36 marks)**

It was appropriate to provide arguments which were structured to follow the problem and solution approach (see Guidelines C-IV 11.7).

3.4.1 **Identifying the Closest Prior Art (3 marks)**

1 mark was available for correctly identifying the closest prior art with respect to the subject matter claimed. **2 marks** were available for justifying the choice.

For the example solution, D1/2 was considered to be the closest prior art. D1/2 is functionally the closest of the available prior art since it concerns a data input device for a computer in which the absolute position of an actuator is determined. In D2, no determination of absolute position is made, the device of D2 merely distinguishes whether or not the position of an actuator is within a selection area. Therefore D2 is not considered to disclose the closest prior art.

3.4.2 **Derivation of the Objective Problem (9 marks)**

Full marks were available for solutions which included all of the following elements a, b and c, but not necessarily in this order:

- The identification of the **features that distinguish** the claim from the stated closest prior art (1 mark).
- Discussion of the technical **effects** or the **advantages** of the distinguishing features identified in part "a". This should include detailed explanations of how the distinguishing features from part "a" achieve the identified technical effects or advantages and not for example be limited to a statement that accuracy is improved (**6 marks**).
- The definition of the **objective problem**. The problem identified should be consistent with the independent claim and should not include elements of the solution (**2 marks**).

Example: For the device claim of the example solution choosing D1 as the closest prior art:

- a. The **distinguishing feature** of the claim is that means for alternately generating a first voltage distribution and a second voltage distribution on the resistive layer are provided, said means being synchronised with the processing unit.
- b. The **technical effect** of this distinguishing feature is that any point on the resistive layer can be uniquely identified since the two voltages picked off are unique to a particular point on the resistive layer. This is not the case in D1, (see par. [005] of the application).

Furthermore the need for any separation regions (between turns of the resistive band in D1), in which no position whatsoever can be determined, is obviated (see par. [005] of the application).

- c. The **objective problem** can therefore be stated as making a data input device for a computer having a moveable actuator which provides output signals representing positions of the actuator with a higher degree of accuracy.

3.4.3 Arguments supporting an Inventive Step (24 marks)

3.4.3.1 General remarks

This year, **24 marks** were available for arguments referring to the relevant available prior art and the objective technical problem derived, to demonstrate that the claimed subject matter was not obvious. Mere statements (without supporting arguments) that there are no hints in a particular document to solve the objective problem/to modify a particular piece of prior art/to combine it with another document attracted no marks.

Arguments based on the following questions were expected:

- a. Would the skilled person arrive at the subject matter of the claim by considering the **closest prior art** in the light of **general knowledge**?
- b. **Would** the skilled person **consider combining** the closest prior art with the other item of prior art?
- c. (Even) **When combining** the teaching of the closest prior art with that of the other item of prior art, **would the skilled person arrive at the subject-matter of the claim?**

3.4.3.2 Example

The following argumentation follows on from the above derivation of the objective problem for the example device claim, D1/2 being the closest prior art. The following arguments are split into three sections, a, b and c. For completeness, there is some overlap in the lines of argument of sections b. and c. For example the argument that the gel layer in the device of D2 hinders rapid movements of an actuator is used in the following sections b. and c. However in order to obtain full marks, it was only necessary for answer papers to have a comprehensive set of arguments in which the most important lines of argument were used at least once.

a. Would the skilled person arrive at the subject matter of the claim by considering D1/2 in the light of general knowledge?

Reading D1 paragraph [007], the skilled person would realise that the accuracy of the joystick device of D1/2 is limited by the separating region between adjacent turns of the resistive layer. The skilled person would therefore attempt to minimise the width of the separating region in order to improve accuracy.

Reading D1 paragraph [006], the skilled person would realise that accuracy of the joystick device of D1/2 is also limited by the fact that at any given distance from a contact point along the resistive layer band, the voltage is the same across the width of the band. The device will therefore be more accurate if the width of the band is minimised.

Starting from D1/2 and considering the above objective problem, the skilled person would therefore modify the joystick device of D1/2 to provide a resistive layer band in the form of a spiral with the band being as narrow as possible, and wherein the separating region between the turns was as narrow as possible. However there would be no hint for the skilled person to arrive at the feature of alternating a voltage distribution across the resistive layer.

b. Would the skilled person consider combining D1/2 with D2 in order to solve the problem of improving the accuracy with which the position of the actuator is determined?

- Document D2 is concerned with determining the presence or absence of a pressing action from a blunt stick actuator (or finger) within a region (see paragraph [011] for example). Therefore D2 is not concerned with accurately determining the position of an actuator.

- Document D2 also discloses that it is necessary to use a finger or an actuator in the form of a blunt stick (see paragraph [007]) in order to prevent the protective layer from being punctured. Because the surface area of a blunt stick or finger is relatively large, it would never be possible to achieve an accurate determination of position.

- Document D2 discloses (paragraph [007]) that it is advantageous to have a large area of contact between the resistive layer and the conductive layer, namely in order to achieve a reliable electrical contact, a large area of contact prevents the accurate determination of a point of contact.

For these reasons, the skilled person would not consider D2 for a finding a solution to the above objective problem of improving accuracy.

The teachings of D1 and D2 are not compatible with each other for the following reasons:

- Document D1 discloses a joystick which has to be capable of following rapid movements of the actuator. Document D2 discloses a device which is designed to respond to a significant pressure of an actuator at a given point. Document D2 includes a gel layer which from general knowledge is known to be viscous and would therefore hinder rapid movements of an actuator, therefore the skilled person would not consider combining the technology of a joystick (D1) with the technology of D2.

- Furthermore the time periods with which the device of D2 switches between voltage distributions (paragraph [010], 0.25 seconds) are considered long enough to detect a pressure in a given area. This implies that they should not be any shorter. Therefore the skilled person would not consider using the teaching of D2 in a device which has an actuator which needs to be moved rapidly.

It is concluded that the skilled person would not consider combining the teaching of D1 and D2 in order to solve the above problem.

c. When combining the teaching of D1/2 with that of D2, would the skilled person arrive at the subject-matter of the claim?

From D1/2, if the skilled person were to incorporate the means of detecting the position of the actuator known from D2, they would take the layers of the panel 201 above the rigid support 202 of D2 and place them on the rigid support 112 of D1/2. The processing unit would therefore also need to be that of D2.

In D2 "significant pressure" is needed to produce an output from the device (see paragraph [006]). Therefore it is doubtful whether the actuator of D1/2 would be suitable for interacting with the layers known from the device of D2.

Furthermore, the tip of the actuator of D1/2 is not blunt but relatively pointed. The above combination of D1/2 and D2 would not function since the protective layer 205 of D2 would be punctured. It would therefore be necessary to make the actuator blunt, which would be contrary to solving the objective problem.

The above combination would also result in a device where the joystick's actuator was resistive to rapid movements because of the gel layer. This would make the combination unsuitable for a data input device such as the joystick of D1/2. Furthermore, the relatively slow switching speed of the device of D2 (see paragraph [010]) would make the device unsuitable for use as a joystick.

The above combination would also result in a device which produced an output, not of absolute position, but of presence or absence within a selection area. It is noted that, whilst in the invention (paragraph [020]) selection areas (zones) are also considered, the output of the data input device is always a position, and not the presence or absence of the actuator within a selection area. Therefore the combination would not lead to a data input device for a computer giving a position output as claimed (within the meaning of position as explained in the application for all embodiments).

Combining D1/2 and D2, in order to arrive at the claimed subject matter, the skilled person would have to carry out the following additional steps: Remove the conductive layer, remove the gel layer, remove the protective layer and modify the control unit of D2 to output absolute position data.

Therefore it would not be obvious for the skilled person to arrive at the subject matter of claim 1 from the teaching of D1/2 and D2 in combination.

Annex 1: Example set of Amended claims

1. Data input device for a computer (1, 11, 21) comprising:
 - a support (2, 12, 22);
 - a resistive layer (6, 16, 26) which is arranged on the support (2, 12, 22) and which is connectable to a voltage supply;
 - a movable actuator (4, 14, 24) comprising a conductive element (8, 18, 28) at one of its ends for picking voltages off the resistive layer (6, 16, 26); and
 - a processing unit (92) for converting the voltages into output signals for the computer which represent positions of the actuator,
characterised in that the device further comprises means for alternately generating a first voltage distribution and a second voltage distribution on the resistive layer, said means being synchronised with the processing unit (92).
2. Data input device (1, 11, 21) according to claim 1 wherein the resistive layer (6, 16, 26) is continuous and covers the entire support (2, 12, 22).
3. Data input device according to claims 1 or 2 wherein said means comprises first and second pairs of contacts (A, B and C, D) for connecting the resistive layer (6, 16, 26) to the voltage supply, and a switch (91) for alternately connecting the first pair of contacts and the second pair of contacts to the voltage supply for consecutive time periods (t1, t2).
4. Data input device (1, 11, 21) according to claim 3 wherein each of the time periods (t1, t2) is 0.01 seconds.
5. Data input device according to any of the preceding claims wherein the data input device is a joystick (1, 11).
6. Data input device according to claim 5 wherein the support (12, 22) is flat and wherein the actuator (14) is telescopic and comprises a spring (20) which urges the conductive element (18) onto the resistive layer (16).
7. Data input device (1) according to claim 5 wherein the support (2) has a hemispherical shape.
8. Data input device according to any of claims 1 to 4 wherein the actuator (24) is freely movable.
9. Data input device according to claim 8 wherein the data input device is a graphics tablet (21).
10. Data input device according to claim 9 wherein the resistive layer (26) comprises selection zones (31, 32) which are graphically represented on the resistive layer (26) by printing with conductive ink.

EXAMINATION COMMITTEE I

Candidate No. _____

Paper B (Electricity/Mechanics) 2008 - Schedule of marks

Category	Maximum possible	Marks awarded	
		Marker	Marker
Independent	35		
Dependent	15		
Claims	50		
Basis for Amendments	10		
Novelty	4		
Inventive Step	36		
Arguments	50		
Total	100		

Sub-Committee for Electricity/Mechanics agrees on marks and recommends the following grade to the Examination Board:

PASS
(50-100)

FAIL
(0-49)
COMPENSABLE FAIL
(45-49, in case the candidate sits
the examination for the first time)

4 July 2008

Chairman of Examination Committee I