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**Datasheet for the decision  
of 26 July 2016**

**Case Number:** T 2014/11 - 3.5.05

**Application Number:** 09179354.7

**Publication Number:** 2222032

**IPC:** H04L12/40, H04L12/24, H03K17/96

**Language of the proceedings:** EN

**Title of invention:**

Switch usage for routing ethernet-based aircraft data buses in avionics systems

**Applicant:**

EMBRAER - Empresa Brasileira de Aeronáutica S.A.

**Headword:**

Avionic switching system/EMBRAER

**Relevant legal provisions:**

EPC Art. 56, 84  
RPBA Art. 13(1)

**Keyword:**

**Decisions cited:**

**Catchword:**



**Beschwerdekammern**  
**Boards of Appeal**  
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Case Number: T 2014/11 - 3.5.05

**D E C I S I O N**  
**of Technical Board of Appeal 3.5.05**  
**of 26 July 2016**

**Appellant:** EMBRAER - Empresa Brasileira de Aeronáutica S.A.  
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**Decision under appeal:** **Decision of the Examining Division of the  
European Patent Office posted on 3 May 2011  
refusing European patent application  
No. 09179354.7 pursuant to Article 97(2) EPC.**

**Composition of the Board:**

**Chair** A. Ritzka  
**Members:** P. Cretaine  
G. Weiss

## Summary of Facts and Submissions

- I. The appeal is against the decision of the examining division to refuse the present European patent application on the grounds of lack of inventive step (Article 56 EPC), having regard to the disclosure of  
  
**D1:** Black Box Network Services (jslebon): "10-MBPS ABC MANUAL SWITCH (SWL065A)", Black Box Corporation, 10 April 2001, page 1/1, 1000 Park Drive, Lawrence, PA 15055-1018, Retrieved from the internet:  
URL: <http://www.blackbox.com/resource/files/productdetails/19431.PDF> [retrieved on 2010-06-29].
- II. The notice of appeal was received on 5 July 2011. The appeal fee was paid on the same day. The statement setting out the grounds of appeal was received on 12 August 2011. The appellant requested that the appealed decision be set aside and that a patent be granted on the basis of claims 1 to 7 filed with the statement setting out the grounds of appeal.
- III. By letter of 13 March 2014, the appellant requested oral proceedings as an auxiliary request.
- IV. By letter of 14 April 2016, the appellant submitted a new set of claims 1 to 15 according to a main request and a new set of claims 1 to 7 according to an auxiliary request. The appellant requested that the decision be set aside and a patent granted based, in order of preference, on the main request, the auxiliary request, or the set of claims 1 to 7 filed with the statement setting out the grounds of appeal. The auxiliary request for oral proceedings was maintained.

V. A summons to oral proceedings was issued on 12 May 2016. In an annex accompanying the summons the board expressed its preliminary opinion that the independent claims of the main request did not fulfil the requirements of Article 56 EPC having regard to the disclosure of D1, in combination with the disclosure of D3: US 6 205 138

cited in the European search report.

The board also expressed the opinion that the claims of the auxiliary request and of the request filed with the statement setting out the grounds of appeal did not meet the requirements of Articles 84 and 56 EPC, having regard to the disclosure of D1.

VI. By letter dated 27 June 2016, the appellant submitted a set of claims according to a second auxiliary request. The appellant further stated that it maintained the main request, and the previous auxiliary request as first auxiliary request.

VII. By letter dated 11 July 2016, the appellant announced that it would not be represented at the scheduled oral proceedings and requested the board to decide based on the state of the file.

VIII. Oral proceedings were held as scheduled on 26 July 2016 in the absence of the appellant. The board established from the file the appellant's final requests. The appellant requested in writing that the decision under appeal be set aside and that a patent be granted based on claims 1 to 15 of a main request or claims 1 to 7 of a first auxiliary request, both requests filed with letter of 14 April 2016, or based on claims 1 to 7 as

filed with the statement setting out the grounds of appeal, or based on claims 1 to 13 of a second auxiliary request as filed with letter of 27 June 2016. After due deliberation on the basis of those requests and the written submissions, the board announced its decision at the end of the oral proceedings.

IX. Claim 1 of the main request reads as follows:

"A method of routing data between avionics equipment comprising:

(a) routing high speed data from first avionics equipment (A) on board an aircraft to second avionics equipment (B) on board said aircraft through an electromechanical switch (70) having at least first and second positions (1,2); and

(b) manually changing the routing of said high speed data from the first avionics equipment (A) to third avionics equipment (C) on board said aircraft and different from said second avionics equipment (B), when the position of the electromechanical switch (70) is changed, wherein said high speed data can flow through said switch (70) at a rate in excess of 1 mbit/second, characterized by the high speed data being routed between avionics equipments on board an aircraft, wherein

said switch (70) in a first position (1) cross-connects said first and second avionics equipment (A, B) and also cross-connects said third avionics equipment (C) with fourth avionics equipment (D), and in a second position (2) different from said first position (1) cross-connects said first and third avionics equipment (A, C) and cross-connects said second and fourth avionics equipment (B, D)."

The main request comprises a further independent claim (claim 5) for a corresponding system.

Independent claim 1 of the first auxiliary request reads as follows:

"A system for routing data between avionics equipment comprising:  
at least one electromechanical switch (50, 60, 70) having at least first and second positions (1, 2), said switch routing high speed data from the first avionics equipment (A) on board an aircraft to the second avionics equipment (B) on board said aircraft, said switch having an actuator for manually changing the position of the electromechanical switch (50, 60, 70) to change the routing of said high speed data from the first avionics equipment (A) to third avionics equipment (C) on board said aircraft and different from said second avionics equipment (B), and high speed data lines coupled to said switch (50, 60, 70), said high speed data lines supporting flow of high speed digital data through said switch (50, 60, 70) at a rate in excess of 1 mbit/second; and  
characterized in that said switch comprises multiple poles, wiper action contacts, sealed bushing, and includes a lever lock, and complies with M1 L-DTL-8834 requirements."

Independent claim 1 of the request filed with the statement setting out the grounds of appeal reads as follows:

"A system for routing data between avionics equipment comprising:

at least one electromechanical switch having at least first and second positions, said switch routing high speed data from first avionics equipment on board an aircraft to second avionics equipment on board said aircraft, said switch manually changing the position of the electromechanical switch to change the routing of said high speed data from the first avionics equipment to third avionics equipment on board said aircraft and different from said second avionics equipment, and high speed data lines coupled to said switch, said high speed data lines supporting flow of high speed digital data through said switch at a rate in excess of 1 mbit/second; and characterized in that said switch comprises multiple poles, wiper action contacts, sealed bushing, includes a lever lock, and comply with MIL-DTL-8834 requirements."

Independent claim 1 of the second auxiliary request reads as follows:

"A method of routing data between avionics equipment comprising:

(a) routing high speed data from a first avionics equipment (A) on board an aircraft to a second avionics equipment (B) on board said aircraft through an electromechanical switch (70) having positions consisting of a first position and a second position; and

(b) manually changing the routing of said high speed data from the first avionics equipment (A) to a third avionics equipment (C) on board said aircraft and different from said second avionics equipment (B), when the position of the electromechanical switch (70) is changed, wherein said high speed data can flow through said switch (70) at a rate in excess of



1 mbit/second,  
characterized by the high speed data being routed between avionics equipment on board an aircraft, wherein said switch (70) in the first position cross-connects said first and second avionics equipment (A, B) and simultaneously cross-connects said third avionics equipment (C) with a fourth avionics equipment (D), and in the second position different from said first position cross-connects said first and third avionics equipment (A, C) and simultaneously cross-connects said second and fourth avionics equipment (B, D)."

The second auxiliary request comprises a further independent claim (claim 5) for a corresponding system.

### **Reasons for the Decision**

1. Non-attendance of the appellant at oral proceedings

The appellant announced that it would not be represented at the oral proceedings and requested a decision based on the state of the file (cf. point VII above). The board considered it expedient to maintain the date set for oral proceedings.

Under Article 15(3) RPBA, the board is not obliged to delay any step in the proceedings, including its decision, by reason only of the absence at the oral proceedings of any party duly summoned, who may then be treated as relying only on its written case.

In the present case, the board was in a position to announce a decision at the end of the oral proceedings in accordance with Article 15(6) RPBA.

2. Main request - Article 56 EPC

D1 discloses a 10 Mbps ABC switch for connecting two PCs to share one Ethernet connection. The switch is manually operated by a rotary knob having two positions such as to allow switching one of the Ethernet cables to one of two other Ethernet cables. Therefore, the switch according to D1 has two positions, connecting an equipment A either to an equipment B or an equipment C.

The board agrees with the appellant that the differences between the subject-matter of claim 1 and the disclosure of D1 are that:

a) the switch in claim 1 connects four items of equipment A, B, C and D such that in the first position of the switch A is connected to B and C is connected to D and in the second position A is connected to C and B is connected to D;

b) the items of equipment are avionics items on board an aircraft.

The appellant argued that the technical effect of the combination of features a) and b) was improved flexibility to connect and exploit redundancies in a system comprising safety-related avionics equipment on board an aircraft.

In the board's judgement, however, features a) and b) are juxtaposed in claim 1 in the sense that their combination does not provide a technical effect going beyond the mere addition of their respective technical effects. The fact that the items of equipment A, B, C and D are avionics items on board an aircraft does not

influence the functioning of the switch itself. The contribution of each feature in respect of inventive step can thus be assessed independently of the other feature.

The technical effect of feature a) is the ability of the switch to connect each one of two items of equipment (A, D) with either of two others (B, C). Based on this technical effect, the objective technical problem can be formulated as how to improve the flexibility and redundancy capability of the switch. The skilled person would come across document D3 which relates to a matrix switch which is able to connect one or more of N inputs to one or more of M outputs and which may be used in switching broadband networks (see column 3, lines 31 to 59). Following the teaching of D3, the skilled person would readily consider expanding the switch of D1 to have a configuration with  $N = 2$  input items of equipment (A, D) connected to  $M = 2$  output items of equipment (B, C), whereby each of the two input items may be connected to either of the two output items, thereby arriving at a switch comprising feature a).

Feature b) relates to the use of the claimed switching method or system in an aircraft environment without defining the equipment's technical features themselves. Moreover, nothing would preclude the switch of D1 from being used in such an environment. Therefore, feature b) does not provide any inventive contribution to the subject-matter of the independent claims.

For these reasons, method claim 1 and corresponding independent system claim 5 do not meet the requirements of Article 56 EPC, having regard to the combination of D1 and D3.

3. First auxiliary request

3.1 Article 84 EPC

Claim 1 specifies that the switch complies with the requirements of the M1 L-DTL 8834 standard. The technical limitations on the claimed switch implied by this compliance are neither described in the application nor commonly known in the art. Therefore the board judges that claim 1 lacks clarity and conciseness.

3.2 Article 56 EPC

The board agrees with the appellant that the differences between the subject-matter of claim 1 and the disclosure of D1 are that:

- a) the items of equipment are avionics items on board an aircraft,
- b) the switch comprises multiple poles, wiper action contacts, sealed bushing and a lever lock, and complies with M1 L-DTL-8834 requirements.

In the board's judgement, features a) and b) are juxtaposed in claim 1, in the sense that their combination does not provide a technical effect going beyond the mere addition of their respective technical effects. The fact that the items of equipment A, B and C are avionics items on board an aircraft does not influence the function and structure of the switch itself. The contribution of each feature in respect of inventive step can thus be assessed independently of the other feature.

Feature a) relates to the use of the claimed switching method or system in an aircraft environment without defining the item of equipment's technical features themselves. Moreover, nothing would preclude the switch of D1 from being used in such an environment. Therefore, feature a) does not provide any inventive contribution to the subject-matter of claim 1.

The structural elements defined in feature b), namely multiple poles, wiper action contacts, sealed bushing and a lever lock represent well-known constructional features of an electromechanical switch. The skilled person is well aware of the advantages and drawbacks of these features and would use them appropriately when trying to improve the robustness and/or safety of the switch. Therefore, in the board's view, these features do not provide any inventive contribution to the subject-matter of claim 1. Further, the compliance with the M1 L-DTL-8834 standard, even if it were considered as defining clear technical limitations on the claimed switch (see section 3.1 above), defines in that case mandatory functional and structural features of the switch which are required by the standard and which the skilled person would implement if required.

For these reasons, the subject-matter of claim 1 does not involve an inventive step, having regard to the disclosure of D1 (Article 56 EPC).

4. Request filed with the statement setting out the grounds of appeal

This request differs from the first auxiliary request only in that the feature of the actuator for manually changing the position of the electromechanical switch has been deleted in claim 1.

Therefore claim 1, like claim 1 according to the first auxiliary request, does not meet the requirements of Articles 56 and 84 EPC.

5. Second auxiliary request

This request was filed with letter of 27 June 2016, i.e. late in the appeal proceedings, in contravention of Article 12(2) and (4) RPBA. In the annex to the summons dated 6 May 2016 the appellant was informed (see last paragraph of the annex) that if amendments to its case were subsequently filed it would be necessary at the oral proceedings to discuss their admissibility and their compliance with the EPC.

Independent claims 1 and 5 of this request have been amended with respect to claims 1 and 5 according to the main request by adding features which appear to aim at improving the clarity of the claims. It is however not clear whether these amendments are such as to overcome the inventive-step objection raised by the board against the claims of the main request. Instead of substantiating in its letter why and how these features contributed to inventive step, the appellant merely indicated that arguments and facts to that effect would be presented during the oral proceedings. By not attending the oral proceedings and requesting a

decision based on the state of the file, the appellant did not submit any such arguments and did not give the board the opportunity to discuss the substance of the amendments.

In view of this request's late submission and lack of substantiation, and the appellant's failure to attend the oral proceedings, the board declined under Article 13(1) and (3) RPBA to admit this request into the proceedings.

## Order

### **For these reasons it is decided that:**

The appeal is dismissed.

The Registrar:

The Chair:



P. Martorana

A. Ritzka

Decision electronically authenticated