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**Datasheet for the decision  
of 17 January 2017**

**Case Number:** T 2459/11 - 3.5.02

**Application Number:** 02736601.2

**Publication Number:** 1384305

**IPC:** H02J7/00, G01R31/36

**Language of the proceedings:** EN

**Title of invention:**

Method and Apparatus for High-Voltage Battery Array Monitoring  
Sensors Network

**Applicant:**

Microchip Technology Incorporated

**Relevant legal provisions:**

EPC Art. 56

**Keyword:**

Inventive step - (no)



**Beschwerdekammern**  
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Case Number: T 2459/11 - 3.5.02

**D E C I S I O N**  
**of Technical Board of Appeal 3.5.02**  
**of 17 January 2017**

**Appellant:** Microchip Technology Incorporated  
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**Representative:** Grubert, Andreas  
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**Decision under appeal:** **Decision of the Examining Division of the  
European Patent Office posted on 20 June 2011  
refusing European patent application No.  
02736601.2 pursuant to Article 97(2) EPC.**

**Composition of the Board:**

**Chairman** R. Lord  
**Members:** G. Flyng  
W. Ungler

## Summary of Facts and Submissions

I. The applicant's appeal contests the examining division's decision to refuse European patent application 02 736 601.2, which is based on the international application published under the PCT as WO 02/091544 A1.

II. Of the documents cited in the contested decision only the following is relevant for the present decision:

D4: US-6133709 A

The examining division found that the subject-matter of claim 1 filed in electronic form on 24 May 2011 did not involve an inventive step within the meaning of Article 56 EPC with regard to document D4 and common general knowledge. The independent method claim 14 was not mentioned in the decision, although the examining division made an "obiter dictum" statement expressing a negative opinion on inventive step for all dependent claims, 2 to 13 and 15 to 24.

III. With the written statement setting out the grounds of appeal the appellant filed claims of a main request and an auxiliary request.

IV. The Board summoned the appellant to attend oral proceedings. In a communication pursuant to Article 15(1) RPBA the Board set out their preliminary observations on the appeal. In particular, the Board made observations on the main request concerning inventive step and stated that they were minded to hold the auxiliary request inadmissible as the appellant had not indicated in the statement of grounds the reasons

why the amended claims of the auxiliary request gave cause to set aside the contested decision.

- V. The appellant responded to the Board's communication with a letter dated 16 December 2016, filing therewith claim sets according to a main request and first and second auxiliary requests.

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 if that was not possible, on the basis of the claims of one of the first and second auxiliary requests, all filed with letter dated 16 December 2016.

- VI. With a fax received at the EPO at 16:13 on 16 January 2017, the day before the scheduled oral proceedings, the appellant's representative advised that they would not be attending the oral proceedings.

- VII. Oral proceedings were held as scheduled on 17 January 2017. No one was present on behalf of the appellant. After deliberation by the Board, the present decision was pronounced.

- VIII. Claim 1 of the **main request** is identical to claim 1 of the main request filed with the written statement setting out the grounds of appeal and identical to claim 1 as formed the basis of the contested decision. It reads as follows:

"1. A battery monitor system comprising:  
- a plurality of cell sensor modules (110, 112, 114, 116; 118, 120, 122, 124) configured to monitor voltage and temperature measurement

values related to an associated battery cell (103);

- a battery sensor module (106; 108) configured to monitor one or more physical parameters related to an associated battery (102; 104); and
- a network (126; 128) connecting said cell sensor modules (110, 112, 114, 116; 118, 120, 122, 124) and battery sensor module (106; 108), said network (126; 128) configured to transmit information to and from said cell and battery sensor modules (110, 112, 114, 116; 118, 120, 122, 124),

characterized in that each of said plurality of cell sensor modules (110, 112, 114, 116; 118, 120, 122, 124) is configured to operate in a low power consumption mode and comprises a controller (212) which is configured to compare voltage and temperature measurements with threshold values and store each excursion beyond an associated threshold value in a non-volatile memory (214)."

Claim 1 of the **first auxiliary request** differs from that of the main request in that it includes at the end the following additional feature:

" , wherein the low power consumption mode causes measurement of the voltage and the temperature less frequently than a normal power consumption mode."

Claim 1 of the **second auxiliary request** is identical to claim 1 filed as an auxiliary request with the statement of grounds of appeal. It differs from claim 1 of the main request in that the characterising portion has been amended as follows (amendments indicated by underlining and strike-out):

"characterized in that each of said plurality of cell sensor modules (110, 112, 114, 116; 118, 120, 122, 124) is configured to operate in a plurality of power modes which include a low power consumption mode and wherein each of the plurality of cell sensor modules (110, 112, 114, 116; 118, 120, 122, 124) are programmed to operate in the low power consumption mode and comprise ~~comprises~~ a controller (212) which is configured to compare voltage and temperature measurements with threshold values and store each excursion beyond an associated threshold value in a non-volatile memory (214)."

IX. Regarding the main request the appellant argues in essence that document D4 does not disclose the features in the characterising part of claim 1.

More particularly, the appellant argues as follows:

- Microcontrollers are well known in the art which comprise various low power operation modes, such as sleep mode (hibernation mode), doze mode, deep sleep mode. Thus, any person skilled in the art would understand that a "low power consumption mode" in a microcontroller includes one of the various sleep modes that have a lower power consumption than a normal operating mode;
- The cell sensor modules (cell monitoring devices  $CM_i$ ) of document D4 are not "configured to operate in a low power consumption mode", contrary to the reasoning set out in "remark 1" of the contested decision; and
- It would not be obvious for the person skilled in the art starting from document D4 to store fault conditions in a non-volatile memory.

The appellant argues that claim 1 of the first auxiliary request includes the limitations of former claim 3 and is based on the disclosure of page 8, lines 12 to 25 as originally filed (see WO 02/091544 A1).

Regarding the second auxiliary request, the appellant argues that by introducing that other operating modes are available this request addresses the issue that the examining division considered the term "low power consumption mode" to have no significant meaning. As this issue only became apparent in the contested decision, this amendment based on page 8, lines 12 to 25 of the originally submitted specification is admissible.

## Reasons for the Decision

### 1. Main Request

- 1.1 It is not contested that document D4 discloses all of the features of the preamble of claim 1. Regarding the features of the characterising portion of claim 1 the Board's findings are as follows.
- 1.2 "cell sensor modules ... configured to operate in a low power consumption mode"
- 1.2.1 Regarding the feature that the cell monitoring devices are "configured to operate in a low power consumption mode", the first question to be considered is how this feature is to be interpreted for the purpose of assessing novelty and inventive step.
- 1.2.2 Article 69 EPC concerns the use of the description and drawings to interpret the claims only for the purpose of determining the extent of protection conferred, not for the purpose of assessing novelty and inventive step. Thus it is justifiable to interpret this feature in the broadest sense possible in the context of the invention as set out in claim 1 of the main request.
- 1.2.3 Given that claim 1 of the main request does not define any other modes of operation that would enable a comparison to be made, such as for example high power consumption mode or an ultra-low power consumption mode or a zero power consumption mode, and since the claim does not give any indication of the manner in which the cell sensor modules operate in the low power consumption mode, no special significance can be



attached to the expression "low power consumption mode".

- 1.2.4 Hence, the Board considers that each of the two modes of operation discussed in document D4 at column 5, lines 9 to 31 can be considered as a low power consumption mode in the sense of claim 1 of the main request. In the first of the disclosed modes, where the central battery monitoring system polls each of the cell monitoring devices in turn, each cell monitoring device only has to respond when it is polled. Thus, it would have a lower power consumption than if it were communicating with the central battery monitoring system continuously. In the second mode of operation communication between the battery monitoring device and the cell monitoring devices only takes place when a cell monitoring device detects a fault condition. Here too there would be a lower power consumption than a situation in which the modules were communicating continuously.
- 1.2.5 Hence, the feature that the cell sensor modules are configured to operate in a low power consumption mode does not distinguish the subject-matter of claim 1 of the main request from the disclosure of document D4.
- 1.2.6 The Board is not convinced by the appellant's argument that the claimed "low power consumption mode" has to be interpreted in the sense of a sleep mode, a hibernation mode, a doze mode or a deep sleep mode. Whilst these examples might fall under the scope of the expression "low power consumption mode" in the context of operating a microcontroller, there is nothing in claim 1 of the main request that gives cause to restrict the interpretation of the expression to these examples.

1.3 "compare voltage and temperature measurements with threshold values and store each excursion beyond an associated threshold value"

1.3.1 In the contested decision the examining division held that in document D4, monitoring for faulty conditions implied that the sensed data and/or values were compared to threshold values because a decision in respect of a faulty condition implied a comparison (see "remark 2") and that at least in the time between detection of a faulty condition and communication of that faulty condition to the central battery monitoring system, the faulty condition had to be stored in some way.

1.3.2 The appellant has not contested this finding and the Board concurs with the examining division on this point.

1.4 "store ... in a non-volatile memory"

1.4.1 The examining division conceded in the contested decision that it was not known from document D4 to use a non-volatile memory for storing the fault conditions (i.e. "excursions"), but argued that this would be an obvious measure in order to avoid loss of fault data, for example:

- in the event of a power-down event;
- when there is a break in communication; or
- when a defective battery cell has to be exchanged.

1.4.2 The appellant argues that in D4 each cell module is powered by the battery cell monitored and hence a person skilled in the art would not consider a power down-event, which could only mean that the cell was dead. In that case there would be no need to evaluate

old data. A non-volatile memory would be unnecessary in the system of D4 and would increase the cost with no benefit.

1.4.3 The Board is not convinced by the above arguments. In D4, a power-down event would not necessarily mean that a cell was "dead". The cell might simply be discharged, in which case stored data pertaining to the cell would still be of use, and could, if kept, be transmitted once the cell was recharged. Furthermore, even in the case of a "dead" cell (i.e. one that is no longer able to be recharged) it might well be useful to carry out a *post-mortem* evaluation of the cell's condition prior to its failure. Hence, the Board finds that a non-volatile memory cannot be considered unnecessary with the system of D4. Whilst it may be the case that a non-volatile memory would be more costly, this is a factor what is well known and is accepted in situations where it is useful to retain data in power-down situations. Hence, the Board considers that this would be an obvious choice for the memory in D4.

1.5 In conclusion, the Board finds that all of the features of a the characterising portion of claim 1 of the main request are either known from document D4 or obvious in the light of common general knowledge of non-volatile memories. The subject-matter of claim 1 of the main request thus lacks an inventive step within the meaning of Article 56 EPC.

## **2. First Auxiliary Request**

2.1 According to claim 1 of the first auxiliary request, "the low power consumption mode causes measurement of the voltage and the temperature less frequently than a normal power consumption mode".

2.2 In D4, in the first of the described modes of operation (see column 5, lines 10 to 20), each cell monitoring device  $CM_i$  performs its tests on the corresponding cell only when it is polled by the central battery monitoring system. In the second mode of operation (see column 5, lines 21 to 30) each cell monitoring device  $CM_i$  monitors the corresponding battery cell continuously. It is evident from this that in the first mode of operation the voltage and temperature measurements are taken less frequently than in the second mode of operation. Hence, the first and second modes of operation of D4 can be considered as low and normal power consumption modes in the sense of claim 1 of the first auxiliary request.

2.3 For these reasons, in addition to those given above for the main request, the Board finds that also the subject-matter of claim 1 of the first auxiliary request lacks an inventive step within the meaning of Article 56 EPC.

### **3. Second Auxiliary Request**

3.1 According to claim 1 of the second auxiliary request, each of the cell sensor modules is configured to operate in a plurality of power modes which include a low power consumption mode and each can be programmed to operate in the low power consumption mode.

3.2 It is evident from the reasoning given above for the first auxiliary request that the above features are known from document D4, where the first and second modes of operation clearly constitute a plurality, and where the first mode of operation can be considered as a low power consumption mode. Hence, the Board finds that also the subject-matter of claim 1 of the second

auxiliary request lacks an inventive step within the meaning of Article 56 EPC.

4. Given that none of the appellant's requests meets the requirements of the EPC, the appeal has to be dismissed.

## Order

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

The appeal is dismissed.

The Registrar:

The Chairman:



U. Bultmann

R. Lord

Decision electronically authenticated