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**Datasheet for the decision  
of 5 October 2017**

**Case Number:** T 1516/12 - 3.5.06

**Application Number:** 03029004.3

**Publication Number:** 1431865

**IPC:** G06F1/32

**Language of the proceedings:** EN

**Title of invention:**

Electrical control unit for an automobile

**Applicant:**

Hitachi, Ltd.

**Headword:**

Activation of sleeping control unit/HITACHI

**Relevant legal provisions:**

EPC 1973 Art. 56

**Keyword:**

Inventive step - (yes)

**Decisions cited:**

**Catchword:**



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Case Number: T 1516/12 - 3.5.06

**D E C I S I O N**  
**of Technical Board of Appeal 3.5.06**  
**of 5 October 2017**

**Appellant:** Hitachi, Ltd.  
(Applicant) 6-6, Marunouchi 1-chome  
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**Representative:** MERH-IP Matias Erny Reichl Hoffmann  
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**Decision under appeal:** **Decision of the Examining Division of the  
European Patent Office posted on 22 December  
2011 refusing European patent application No.  
03029004.3 pursuant to Article 97(2) EPC.**

**Composition of the Board:**

**Chairman** W. Sekretaruk  
**Members:** G. Zucka  
A. Teale

## **Summary of Facts and Submissions**

I. The appeal is against the decision by the examining division, dispatched with reasons on 22 December 2011, to refuse European patent application 03029004.3 on the basis that the subject-matter of independent claim 1 of all requests was not inventive, Article 56 EPC 1973. The following documents were cited in the procedure before the first instance:

D1 = GB 2 130 765 A  
D2 = US 4 203 153 A  
D3 = GB 2 305 557 A  
D4 = US 4 455 623 A  
D5 = EP 0 930 200 A  
D6 = JP 06 146 958 A  
D7 = EP 1 155 886 A  
D8 = US 4 403 309 A.

II. A notice of appeal was received on 1 March 2012, the appeal fee being paid on the same day. A statement of grounds of appeal was received on 1 May 2012.

III. The appellant requested that the decision under appeal be set aside and a patent granted on the basis of the claims of a main or one of six auxiliary requests filed with the grounds of appeal. The appellant made a conditional request for oral proceedings.

IV. The board issued a summons to oral proceedings. In an annex to the summons, the board set out its preliminary opinion on the appeal. In a letter dated 5 September 2017, the appellant replied to the summons, maintaining his requests.

V. During the oral proceedings, the appellant withdrew the auxiliary requests and filed replacement description pages.

VI. The appellant requests that the decision under appeal be set aside and a patent be granted in the following version:

claims 1 to 6 of the main request, dated 27 April 2012;

description

pages 1,5-9 and 17 as originally filed,

page 2, received 29 December 2009,

pages 2a,3,4,10-16 and 18-24, received 5 October 2017;

drawing sheets 1-12, as originally filed.

VII. The independent claim, *i.e.* claim 1, reads as follows:

"An electrical control unit for an automobile comprising:

a microcomputer (30) which controls equipment installed in an automobile,

an input circuit which passes an electric signal from the outside to said microcomputer (30),

a driver circuit which outputs the electric signal output from said microcomputer (30) outside, and

a power supply circuit (10A) which supplies power to said microcomputer (30),

wherein said power supply circuit (10A) is a semiconductor IC integrating the following components:

a communication driver (18) which transmits and receives the communication signal with an outside electrical control unit through a communications line (25);

a first regulator (12) providing a first power supply to a CPU core (VDDL) of said microcomputer (30) to operate said microcomputer (30) based on an ignition switch signal or at least one wake-up signal received from the outside through said communication driver (18);

a second regulator (11a) providing a backup power supply to the components of the microcomputer (30) that require a power supply when the microcomputer is in a sleep state and which operates even when said ignition switch signal is cut off;

an OR circuit (14) activating said first regulator (12) by using either the ignition switch signal or the at least one wake-up signal;

a start factor determining means to determine a start factor that determines which of the ignition switch signal or the at least one wake-up signal has activated said first regulator (12), wherein

said start factor determining means includes a register which stores said start factor, and said start factor is transmitted from the register to said microcomputer (30) after it is waked [(sic)] up;

a latch circuit (16) to latch the wake-up signals transmitted from the outside electrical control unit through said communications line (25);

a reset circuit (13) which generates a reset signal to said microcomputer (30);

a watchdog timer (21) to prevent the runaway of the active program in said microcomputer (30); and

a serial communications module (20) which communicates serially with said microcomputer (30)."

VIII. At the end of the oral proceedings, the chairman announced the board's decision.

## **Reasons for the Decision**

1. *The admissibility of the appeal*

The appeal is admissible.

2. *The invention*

The invention relates to a microcomputer for a car (description, par. [0001]). Such a microcomputer needs to be supplied with power when it is woken up by, for instance, an ignition switch signal (description, par. [0002]). However, if the microcomputer is woken up by a wake-up signal other than the ignition switch signal, *i.e.* when the motor is not running, it will drain power from the car battery (description, par. [0003]). In order to limit the power consumption in such a case, it is necessary for the microcomputer to determine whether it has been woken up by such a different wake-up signal (description, page 7, line 10: "start factor determining means"). The microcomputer would therefore in principle need to wake up fast enough to be able to establish which signal has woken it up.

The invention avoids this requirement by providing a register which stores the start factor that determines which of the ignition switch signal or some other wake-up signal has woken up the microcomputer (description, page 16, line 18). The start factor can then be retrieved from that register by the microcomputer, once it has woken up (description, page 17, lines 22 to 24).

3. *Inventive step; Article 56 EPC 1973*

3.1 The board considers D1 to represent the most suitable starting point for the analysis of inventive step. This document relates to an on-board computer for a vehicle where only a few modules (e.g. the wake-up module) remain permanently connected to the power supply while all other modules are disconnected from the power supply when the ignition switch is open.

D2 relates to a microprocessor system which is only connected to the power supply for performing tasks and, upon completion of a task, transfers control to a timer and disconnects itself from the power supply.

D3 relates to a standard timer.

D4 relates to a microprocessor in a car which is only connected to the power supply in case of an external event for performing a corresponding task.

D5 discloses a procedure where temporarily, when the presence of a person is detected, an accessory in a car is connected to the power supply.

In D6 an amount of fuel to be injected when a car is started is calculated, taking into account fuel leakage over time.

D7 relates to a safety device for a vehicle that has a main and an auxiliary battery and a switch-over circuit.

D8 relates to an automatic back-up circuit.



3.2 It is common ground (see reasoning in the grounds for the appealed decision, section 2.1) that D1 discloses, in figures 2, 4 and 5 and the corresponding text passages, an electrical control unit for an automobile comprising:

a microcomputer which controls equipment installed in an automobile,  
an input circuit which passes an electric signal from the outside to said microcomputer,  
a driver circuit which outputs the electric signal output from said microcomputer outside, and  
a power supply circuit which supplies power to said microcomputer.

3.3 The appellant submits that the following features of claim 1 of the main request are not disclosed by D1:

- (a) said power supply circuit (10A) is a semiconductor IC integrating the following components:
- (b) a communication driver (18) which transmits and receives the communication signal with an outside electrical control unit through a communications line (25);
- (c) a first regulator (12) providing a first power supply to a CPU core (VDDL) of said microcomputer (30) to operate said microcomputer (30) based on an ignition switch signal or at least one wake-up signal received from the outside through said communication driver (18);
- (d) a second regulator (11a) providing a backup power supply to the components of the microcomputer (30) that require a power supply when the microcomputer is in a sleep state and which

operates even when said ignition switch signal is cut off;

- (e) a start factor determining means to determine a start factor that determines which of the ignition switch signal or the at least one wake-up signal has activated said first regulator (12), wherein said start factor determining means includes a register which stores said start factor, and said start factor is transmitted from the register to said microcomputer (30) after it is waked up [*sic*];
- (f) a latch circuit (16) to latch the wake-up signals transmitted from the outside electrical control unit through said communications line (25);
- (g) a reset circuit (13) which generates a reset signal to said microcomputer (30);
- (h) a watchdog timer (21) to prevent the runaway of the active program in said microcomputer (30) and
- (i) a serial communications module (20) which communicates serially with said microcomputer (30).

3.4 The board considers that a decision on inventive step can be taken by focusing on feature (e), which is not disclosed by D1.

3.5 The register in the start factor determining means of feature (e), by storing a start factor which determines which of the ignition switch signal or the at least one wake-up signal has activated the first regulator, solves the objective technical problem of providing an alternative activation capability for switching the microcomputer from a sleep to an awake state. The register has the advantage that the microprocessor need not wake up fast enough to capture which signal has

caused it to wake up, allowing slower microprocessors to be used in this application.

- 3.6 None of the documents cited in the search report discloses or renders obvious such a way of proceeding.

Document D4 contains the following passage, in column 2, lines 43 to 51:

"Control signals of very short duration can be applied to terminal 15, for example control signals for locking the doors as well as for unlocking the doors, for energizing the alarm device or other functions whose duration is fixed and independent of the duration of the control signal. For such functions, voltage must continue to be applied to the microprocessor until the program has been completely carried out, that is even following the end of the control signal."

However, a continuous application of voltage even after the control signal has ended does not imply or render obvious the presence of a *register* as a skilled person would understand this term.

- 3.7 The board therefore finds that the subject-matter of claim 1 of the main request involves an inventive step, Article 56 EPC 1973.

## Order

### For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the examining division with the order to grant a European patent with the following documents:

claims 1 to 6 of the main request, dated 27 April 2012;

description

pages 1, 5-9 and 17, as originally filed,

page 2, received 29 December 2009,

pages 2a,3,4,10-16 and 18-24, received 5 October 2017;

drawing sheets 1-12, as originally filed.

The Registrar:

The Chairman:



B. Atienza Vivancos

W. Sekretaruk

Decision electronically authenticated