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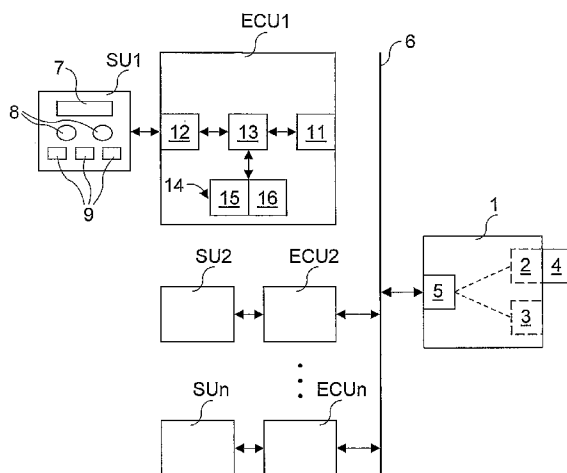
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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: ARRANGEMENT IN A VEHICLE FOR SETTING SETTABLE VEHICLE FUNCTIONS IN ACCORDANCE WITH PREVIOUS SETTINGS



(57) Abstract: In an arrangement in a vehicle for automatically setting settable vehicle functions (SU1, SU2 ... SUn) in accordance with previous settings for a user of the vehicle, a tachograph 5 (1) that is connected to a vehicle internal bus (6) is adapted, in response to insertion into the tachograph (1) of an authorization card (4) with a user specific code, to supply the user specific code of the inserted card (4) to the vehicle internal bus (6). Separate control units (ECU1, ECU2 ... ECUn) associated with the respective settable vehicle function (SU1, SU2 ... SUn) are connected to the vehicle internal bus (6) to receive the user 10 specific code. Each control unit (ECU1, ECU2 ... ECUn) is adapted to check, for each card (4) inserted into the tachograph (1), whether the user specific code of the card (4) and any setting of the corresponding, settable vehicle function (SU1, SU2 ... SUn) for the user are recorded in the control unit and, if that is the case, to set the settable function (SU1, SU2 ... SUn) as recorded and, if that is not the case, to record the user specific 15 code and any setting of the settable function made for the user while the card (4) is in the tachograph (1). (Fig. 1)

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ARRANGEMENT IN A VEHICLE FOR SETTING SETTABLE VEHICLE  
FUNCTIONS IN ACCORDANCE WITH PREVIOUS SETTINGS

TECHNICAL FIELD

- 5 The invention relates generally to vehicles and more specifically to an arrangement in a vehicle for automatically setting settable vehicle functions in accordance with previous settings for a user of the vehicle.

BACKGROUND OF THE INVENTION

- 10 DE 38 17 495 C2 discloses such an arrangement in which the settings of different settable vehicle functions that a user of the vehicle makes are recorded in a memory in the vehicle switch key and the vehicle functions are set as recorded the next time the switch key is used.

- 15 The arrangement according to DE 38 17 495 C2 is suitable only for vehicles that are used by one and the same user all the time but unsuitable for vehicles that are frequently used by many different users such as e.g. trucks in large haulage contractor firms.

- US 4,698,571 in turn discloses an arrangement with a central memory in the vehicle in  
20 which settings for four different users can be recorded. The settings are then reinstated by depressing one of four command keys on a control console.

Also the arrangement according to US 4,698,571 is unsuitable for e.g. trucks that are used by many different users, i.e. more than four different users.

- 25 US 6 198 996 discloses an arrangement in a vehicle for automatic adjustment of settable vehicle functions in correspondence with previously stored user specific function parameters. The user specific function parameters are here set or adjusted in a plurality of subsystems throughout the vehicle by an onboard computer either according to user  
30 specific parameters as read from storage on a user smartcard being inserted in a card reader connected to the onboard computer or as collected from storage in a memory

space of the onboard computer itself. Furthermore, an embodiment is described where the vehicle operator adjusts the parameters manually.

A problem associated with the above described prior art solution for automatic parameter setting of vehicle functions is related to such settings traditionally being performed by only one control unit, i.e. computer, and concerns the amount of data then being communicated. Since vehicle systems of today often are interconnected through a vehicle internal data communication network, such as a CAN, through at least one serial network bus, e.g. CAN bus, all the parameter data as well as the instructions data for adjusting such parameters according to stored user specifications are communicated on the bus to the concerned vehicle systems by the computer and the functions accordingly adjusted therein by the same. A large amount of data being communicated and occupying the serial bus at more or less the same time could, as in a case where such parameter settings are performed in a multitude of vehicle systems/subsystems simultaneously, for example upon reading such data from a user smart card or central memory storage space as described above, result in certain user specific parameters not being set as instructed by the onboard computer or control unit due to an overload condition occurring on the data bus, i.e. the shear data load on the bus resulting in a data communication failure. In practice when this has occurred, as a security measure, a default parameter value has been set instead. Also such a data bus overload situation could, at least momentarily, jeopardize other data communication on the bus, such as between control units of the different vehicle systems, and could then be the cause of delayed vehicle function response at best and vehicle function failure at worst. Furthermore, if a function for queuing messages on the bus exists for solving such a data bus overload situation the settable vehicle functions are still adjusted at a slower rate than necessary. Also, the parameter setting computer or control unit itself could be correspondingly affected by and, for example, experience reduced capability from such a data overload situation as being the sole processing unit performing all such settings.

Thus, there is a need for an arrangement that enables automatic setting of settable vehicle functions in accordance with previous settings for a plurality of different users of the

vehicle, which is provided through a minimum of data communication on a vehicle internal bus.

#### SUMMARY OF THE INVENTION

5 The object of the invention is to bring about such an arrangement.

This is attained by the arrangement according to the invention for automatically setting settable vehicle functions in accordance with previous settings for a user of the vehicle, in that a tachograph that is connected to a vehicle internal bus is adapted, in response to  
10 insertion into the tachograph of an authorization card with a user specific code, to supply the user specific code of the inserted card to the vehicle internal bus, and in that separate control units associated with the respective settable vehicle function are connected to the vehicle internal bus to receive the user specific code, each control unit being adapted to check, for each card inserted into the tachograph, whether the user specific code of the  
15 card and any setting of the corresponding, settable vehicle function for the user are recorded in the control unit and, if that is the case, to set the settable function as recorded and, if that is not the case, to record the user specific code and any setting of the settable function made for the user while the card is in the tachograph.

20 Hereby, since every setting of the settable vehicle functions to a preferred setting has to be done just once for each user, the stress on the users, e.g. the drivers, will henceforth be reduced to a large extent and, consequently, the traffic safety will increase due to the fact that they will not have to worry about any settings. Moreover the communication on the vehicle internal bus is distributed through the different control units recording and setting  
25 their respective own associated vehicle functions. Hence the communication on the bus can be reduced in the case where previous user settings have been recorded and stored locally on the respective control units.

In one embodiment, one of the control units is adapted to receive the user specific code  
30 supplied by the tachograph and to supply it to the other control units via the vehicle internal bus.

Hereby, the communication between the separate control units and the tachograph on the vehicle internal bus will be reduced even further.

- 5 The object is also attained by the arrangement according to the invention for automatically setting settable vehicle functions in a vehicle in accordance with previous settings for a user of the vehicle, in that a tachograph that is connected to a vehicle internal bus is adapted, in response to insertion into the tachograph of an authorization card with a user specific code, to supply the user specific code of the inserted card to the  
10 vehicle internal bus, and that separate control units associated with the settable vehicle function are connected to the vehicle internal bus, one of the control units being adapted to receive the user specific code of each card inserted into the tachograph and to check whether it has already recorded that particular user specific code and any settings of the settable vehicle functions associated with that particular user specific code and, if that is  
15 the case, to cause the respective control unit to set the associated settable vehicle function as recorded and, if that is not the case, to record the user specific code and any settings of the associated settable vehicle functions made for the user while the card is in the tachograph.
- 20 In one embodiment, the settable vehicle functions are at least one of desired language of displays, desired temperature scale, desired temperature of auxiliary heater, desired alarm time of alarm clock, desired local time of time displays, desired time gap to be maintained to a vehicle in front in an activated adaptive cruise control system, desired speed not to be exceeded in an activated speed control system when travelling downhill,  
25 and desired offset speed relative to a set cruise control speed in an activated speed control system when travelling downhill.

By enabling automatic setting of the above vehicle functions, the different users of the vehicle will save a lot of time.

## BRIEF DESCRIPTION OF THE DRAWING

The invention will be described more in detail below with reference to the appended drawing on which Fig. 1 is a schematic illustration of one embodiment of an arrangement according to the invention.

5

## DESCRIPTION OF THE INVENTION

Fig. 1 is a schematic illustration of one embodiment of an arrangement according to the invention in a vehicle for automatically setting settable vehicle functions in accordance with previous settings made for a user of the vehicle.

10

In Fig. 1, 1 denotes a digital tachograph that is based e.g. upon European Council Regulation EEC No 3820/85 and 3821/85 amended by 2135/98 Annex 1B and that is to be installed in trucks in the near future.

15 The tachograph 1 in Fig. 1 has two slots 2, 3 for smart cards. A smart card 4 is shown inserted into slot 2 in Fig. 1.

The smart cards are authorization cards with user specific codes and are issued by the authorities to authorized drivers and co-drivers of trucks to keep track of the activities of the various drivers using the vehicle while inserted into the tachograph 1.

20

In a manner known per se, the tachograph 1 has an input/output (I/O) port 5 and is able to supply information via that I/O port 5 about the fact that a card 4 is present in the slots 2, 3 as well as about the user specific code of the particular card 4.

25

Since the tachograph 1 as such is not the object of this invention, it is not shown in detail in Fig. 1 but connections between the slots 2, 3 and the I/O port 5 are merely indicated by means of broken lines and the function of the tachograph 1 as such will not be further described in this connection.

30

In accordance with the invention, the I/O port 5 of the tachograph 1 is connected to a vehicle internal bus 6, e.g. a CAN bus, a LIN bus, a MOST bus, a USB bus, a D2B bus, a RS-232 bus or the like, to which also a number of electronic control units ECU1, ECU2 ... ECU<sub>n</sub> are connected.

5

Since the control units ECU1, ECU2 ... ECU<sub>n</sub> are more or less identical, only control unit ECU1 is shown in any detail.

The control units ECU1, ECU2 ... ECU<sub>n</sub> are associated with different settable vehicle functions, of which only the corresponding setting units SU1, SU2 ... SU<sub>n</sub> for the settable vehicle functions are shown in Fig. 1.

Since also the setting units SU1, SU2 ... SU<sub>n</sub> for the settable vehicle functions comprise more or less identical elements, at least externally, only setting unit SU1 is shown in more detail for purpose of illustration.

The setting unit SU1 in Fig. 1 comprises at least one of a display 7, a couple of knobs 8 and three buttons 9 for setting the corresponding vehicle function in accordance with the user's preferences.

20

The control unit ECU1 in Fig. 1 comprises a processor 13 that is connected to two I/O ports 11, 12, and to a storage unit 14 that comprises a control program memory 15 and a parameter memory 16 for recording user identities and settings related to the identities.

In the control unit ECU1 in Fig. 1, the I/O port 11 is connected to the vehicle internal bus 6 and the I/O port 12 is connected to the setting unit SU1.

By means of the setting units SU1, SU2 ... SU<sub>n</sub> and the control units ECU1, ECU2 ... ECU<sub>n</sub>, anyone of the following vehicle functions can be set individually for a plurality of users of the vehicle in accordance with the invention as will be described more in detail below:

30

Desired language of displays in the vehicle

Hereby, drivers from different countries will be able to use the vehicle.

5 Desired temperature scale

The driver will be able to choose whether degrees Celsius or degrees Fahrenheit should be shown.

Desired temperature of auxiliary heater

10 This will enable each driver to easily obtain the comfort temperature that he/she is used to.

Desired alarm time of alarm clock

Hereby, the driver will not oversleep.

15

Desired local time of time displays

Hereby, the time display can be set to run a few minutes ahead of actual time in order for the driver to be ahead of time to e.g. a ferry port.

20 Desired time gap to be maintained to a vehicle in front in an activated adaptive cruise control system

Since the desired time gap is very individual to each driver, he/she will not have to bother setting it every time the vehicle is used.

25 Desired speed not to be exceeded in an activated speed control system when travelling downhill

By once setting the number of km/h, e.g. 80 km/h that is not to be exceeded when travelling downhill, the respective driver can drive more relaxed.

30 Desired offset speed relative to a set cruise control speed in an activated speed control system when travelling downhill



By once setting the maximum increase in speed, e.g. 5 km/h that can be accepted when travelling downhill, the respective driver will not have to worry about downhill driving.

5 Upon insertion of the smart card 4 into the slot 2 of the tachograph 1 by a user of the vehicle, the user specific code on the card 4 is read and recorded by the tachograph 1 in order to keep track of the activities of the user in a manner that will not be described in this connection.

10 Also, upon a restart of the vehicle with the smart card 4 already present in the tachograph 1, the user specific code on the card 4 will be read and recorded by the tachograph 1.

In accordance with one embodiment of the arrangement according to the invention, the tachograph 1 transmits information about the fact that card 4 is present in slot 2 via I/O port 5 to the vehicle internal bus 6 to be received by all the control units ECU1, ECU2 ...  
15 ECU<sub>n</sub> via their respective I/O ports corresponding to I/O port 11 of control unit ECU1, whereupon the processors 13 of the control units ECU1, ECU2 ... ECU<sub>n</sub> under control of the control program in control program memories 15 request the tachograph 1 to transmit the user specific code of card 4 to identify the user to the control units ECU1, ECU2 ... ECU<sub>n</sub>.

20 The user specific code of card 4, i.e. the identity of the user is then recorded in the parameter memories 16 of the control units ECU1, ECU2 ... ECU<sub>n</sub>.

25 In accordance with another embodiment of the arrangement according to the invention, the tachograph 1 transmits information about the fact that card 4 is present in slot 2 via I/O port 5 to the vehicle internal bus 6 to be received by only one of the control units ECU1, ECU2 ... ECU<sub>n</sub> that has been appointed master control unit for this purpose, e.g. control unit ECU1.

30 In this case, only control unit ECU1 requests the tachograph 1 to transmit the user specific code of card 4 to identify the user, whereupon control unit ECU1 records the

user specific code in parameter memory 16 and transmits the user specific code to the other control units, i.e. control units ECU2 ... ECU<sub>n</sub> that record the user specific code, i.e. the identity of the user in their respective parameter memories 16.

5 Hereby, there will be less communication on the vehicle internal bus 6 between the tachograph 1 and the control units ECU2 ... ECU<sub>n</sub>.

Suppose that card 4 has not been inserted into the tachograph 1 before, i.e. it is the first time this particular driver is about to use the vehicle in question.

10 When the user specific code of card 4, i.e. the identity of the user has been recorded in the parameter memory 16 of the control units ECU1, ECU2 ... ECU<sub>n</sub> as described above, any setting of the settable vehicle functions made by the user in accordance with the user's preferences by means of the display 7, the knobs 8 and the buttons 9 of the setting  
15 units SU1, SU2 ... SU<sub>n</sub> as long as the card 4 remains in slot 2, will be received by the processor 13 via I/O port 12 of the respective control unit ECU1, ECU2 ... ECU<sub>n</sub> and recorded in the parameter memory 16 together with the identity of the user.

20 Upon withdrawal of card 4 from the tachograph 1 by the user, the latest settings made by the user are saved in the parameter memory 16 together with the identity of the user in question for future use.

When a new user inserts his/her card 4 into the tachograph 1, the process described above is repeated for the new user.

25 It is to be understood that the process described above is also repeated upon insertion of a card into slot 3 of the tachograph 1 for setting co-driver/passenger related vehicle functions of the vehicle.

30 The subsequent time one and the same user inserts his/her card 4 into the tachograph 1 and his/her identity has been established by the processors 13 of the different control

units ECU1, ECU2 ... ECU<sub>n</sub>, any settings recorded in parameter memories 16 together with that particular identity are transmitted via I/O ports 12 to the setting units SU1, SU2 ... SU<sub>n</sub> to set the settable vehicle functions of the vehicle accordingly.

- 5 Preferred settings of vehicle functions for potential users of a vehicle can also be recorded in advance in the parameter memory of the control units of the vehicle together with the identities of the potential users of the vehicle, by e.g. the manufacturer of the vehicle or the control units.
- 10 Hereby, since at least some vehicle functions will be set automatically already the first time the respective potential user's card is inserted into the tachograph, the work load on the respective user will be reduced further.

In accordance with a further embodiment of the arrangement according to the invention,  
15 one of the control units ECU1, ECU2 ... ECU<sub>n</sub>, e.g. control unit ECU1 is appointed central control unit without necessarily having a setting unit of its own for setting settable vehicle functions.

However, in the following description, it is assumed that the now central control unit  
20 ECU1 has its own setting unit SU1 as shown in Fig. 1.

In accordance with this embodiment of the invention, all user specific codes and all settings of the settable vehicle functions are recorded in the parameter memory 16 of ECU1. Thus, all settings made for a user by means of setting units SU2 ... SU<sub>n</sub> are  
25 communicated via the vehicle internal bus 6 to ECU1 by the other control units ECU2 ... ECU<sub>n</sub>.

As above, the tachograph 1 transmits information about the fact that a card 4 is present in slot 2 via I/O port 5 to the vehicle internal bus 6 to be received by only ECU1.

In this case, ECU1, after having received the user specific code from the tachograph 1, checks whether any settings of settable vehicle functions associated with this particular user specific code are already recorded in its parameter memory 16 both for its own setting unit SU1 and for the other control units ECU2 ... ECU<sub>n</sub> and their respective setting units SU2 ... SU<sub>n</sub>.

If there are settings already recorded in the parameter memory 16 of ECU1, indicating that settings have been recorded in advance and/or that the card 4 in question already has been inserted into the tachograph 1 at least once and settings have been made for the user in question by means of the setting units SU2 ... SU<sub>n</sub> as communicated to ECU1 via the vehicle internal bus 6 by the other control units ECU2 ... ECU<sub>n</sub>, ECU1 will instruct its own setting unit SU1 and, via the vehicle internal bus 6, the control units ECU2 .... ECU<sub>n</sub> to cause their respective setting units SU2 ... SU<sub>n</sub> to set the associated settable vehicle function as recorded in the parameter memory 16 of ECU1.

If there are no settings recorded in the parameter memory 16 of ECU1, ECU1 will record the user specific code of the card 4 and any settings of the settable vehicle functions made for the user by means of the setting units SU1, SU2 ... SU<sub>n</sub> and communicated to ECU1 by the respective control unit ECU2 ... ECU<sub>n</sub> via the vehicle internal bus 6 while the card (4) is in the tachograph (1).

## CLAIMS

1. An arrangement in a vehicle for automatically setting settable vehicle functions in accordance with previous settings for a user of the vehicle, characterized in
- 5 - that a tachograph (1) that is connected to a vehicle internal bus (6) is adapted, in response to insertion into the tachograph (1) of an authorization card (4) with a user specific code, to supply the user specific code of the inserted card (4) to the vehicle internal bus (6), and
- that separate control units (ECU1, ECU2 ... ECU<sub>n</sub>) associated with the respective
- 10 settable vehicle function (SU1, SU2 ... SU<sub>n</sub>) are connected to the vehicle internal bus (6) to receive the user specific code, each control unit (ECU1, ECU2 ... ECU<sub>n</sub>) being adapted to check, for each card (4) inserted into the tachograph (1), whether the user specific code of the card (4) and any setting of the corresponding, settable vehicle function (SU1, SU2 ... SU<sub>n</sub>) for the user are recorded in the control unit and, if that is the
- 15 case, to set the settable function (SU1, SU2 ... SU<sub>n</sub>) as recorded and, if that is not the case, to record the user specific code and any setting of the settable function made for the user while the card (4) is in the tachograph (1).
2. The arrangement according to claim 1, characterized in that one of the control units
- 20 (ECU1) is adapted to receive the user specific code supplied by the tachograph (1) and to supply it to the other control units (ECU 2 ... ECU<sub>n</sub>) via the vehicle internal bus (6).
3. The arrangement according to claim 1 or 2, characterized in that the settable vehicle functions (SU1, SU2 ... SU<sub>n</sub>) are at least one of desired language of displays, desired
- 25 temperature scale, desired temperature of auxiliary heater, desired alarm time of alarm clock, desired local time of time displays, desired time gap to be maintained to a vehicle in front in an activated adaptive cruise control system, desired speed not to be exceeded in an activated speed control system when travelling downhill, and desired offset speed relative to a set cruise control speed in an activated speed control system when travelling
- 30 downhill.

4. An arrangement in a vehicle for automatically setting settable vehicle functions in accordance with previous settings for a user of the vehicle, characterized in
- that a tachograph (1) that is connected to a vehicle internal bus (6) is adapted, in response to insertion into the tachograph (1) of an authorization card (4) with a user specific code, to supply the user specific code of the inserted card (4) to the vehicle internal bus (6), and
  - that separate control units (ECU1, ECU2 ... ECU<sub>n</sub>) associated with the settable vehicle function (SU1, SU2 ... SU<sub>n</sub>) are connected to the vehicle internal bus (6), one of the control units (ECU1) being adapted to receive the user specific code of each card (4) inserted into the tachograph (1) and to check whether it has already recorded that particular user specific code and any settings of the settable vehicle functions (SU1, SU2 ... SU<sub>n</sub>) associated with that particular user specific code and, if that is the case, to cause the respective control unit to set the associated settable vehicle function (SU1, SU2 ... SU<sub>n</sub>) as recorded and, if that is not the case, to record the user specific code and any settings of the associated settable vehicle functions made for the user while the card (4) is in the tachograph (1).
5. The arrangement according to claim 4, characterized in that the settable vehicle functions (SU1, SU2 ... SU<sub>n</sub>) are at least one of desired language of displays, desired temperature scale, desired temperature of auxiliary heater, desired alarm time of alarm clock, desired local time of time displays, desired time gap to be maintained to a vehicle in front in an activated adaptive cruise control system, desired speed not to be exceeded in an activated speed control system when travelling downhill, and desired offset speed relative to a set cruise control speed in an activated speed control system when travelling downhill.

1/1

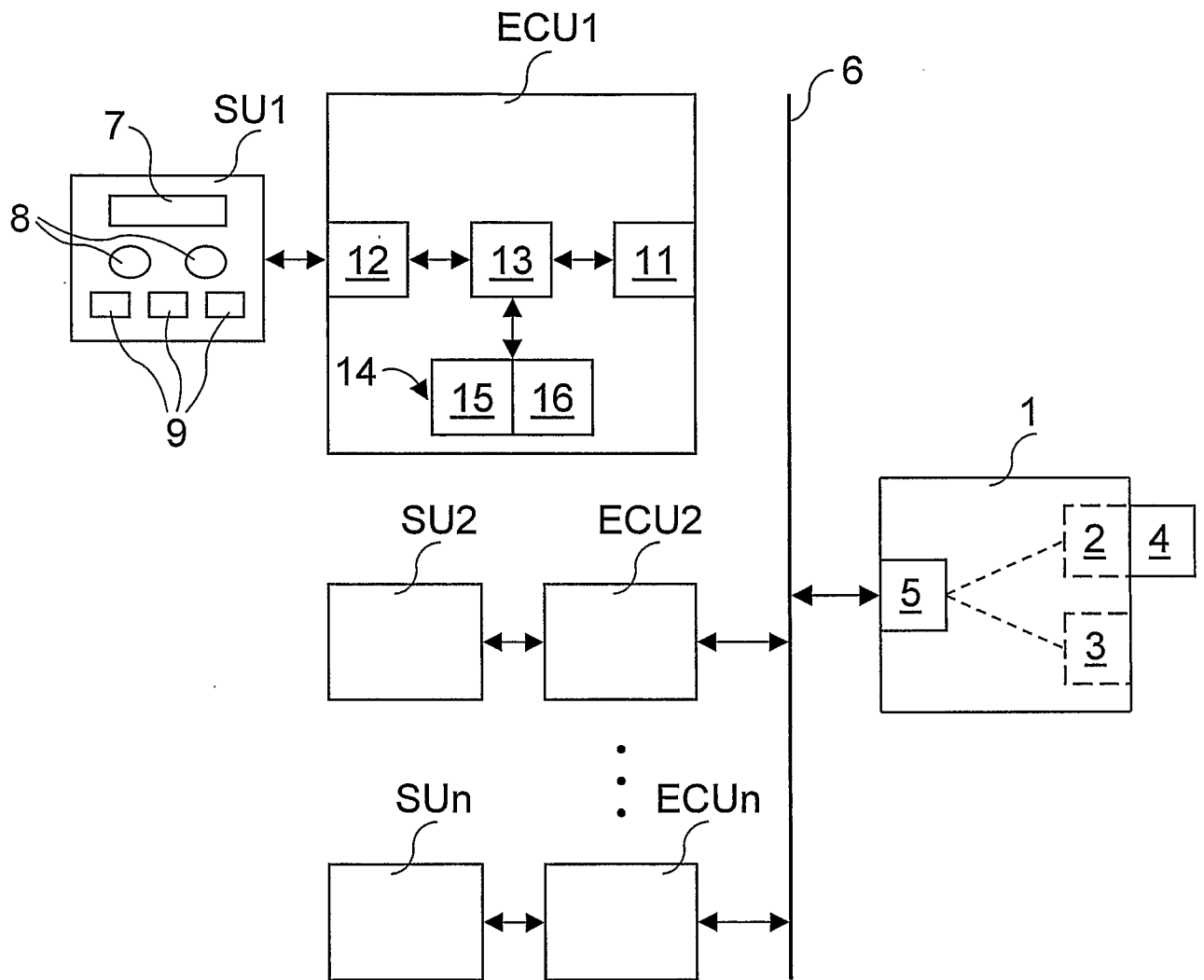


Fig. 1

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/SE2006/050241

## A. CLASSIFICATION OF SUBJECT MATTER

IPC: see extra sheet

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: B60R, G07C, G06K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI DATA, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6198996 B1 (VIKTORS BERSTIS), 6 March 2001 (06.03.2001), column 2, line 66 - column 3, line 54; column 5, line 62 - column 6, line 42; column 20, line 14 - line 29, abstract --	1-5
X	US 6430488 B1 (KENNETH ALAN GOLDMAN ET AL.), 6 August 2002 (06.08.2002), column 4, line 59 - column 5, line 55; column 12, line 37 - line 39, abstract --	1-5
X	US 20040019416 A1 (KUO-RONC CHEN ET AL.), 29 January 2004 (29.01.2004), [0021]-[0023], abstract --	1-5



Further documents are listed in the continuation of Box C.



See patent family annex.

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Date of the actual completion of the international search

10 October 2006

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## INTERNATIONAL SEARCH REPORT

International application No.

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 20020197976 A1 (JONATHAN LIU ET AL.), 26 December 2002 (26.12.2002), abstract  --	1-5
A	WO 03084787 A1 (TAIPALE AUTOMOTIVE OY), 16 October 2003 (16.10.2003), abstract  --	1-5
A	EP 1211141 A2 (HEWLETT-PACKARD COMPANY), 5 June 2002 (05.06.2002), abstract  --	1-5
A	US 6131060 A (MICHAEL L. OBRADOVICH ET AL.), 10 October 2000 (10.10.2000), abstract  --	1-5
A	EP 0895199 A2 (MANNESMANN VDO AKTIENGESELLSCHAFT), 3 February 1999 (03.02.1999), abstract  -- -----	1-5

INTERNATIONAL SEARCH REPORT

International application No.  
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**International patent classification (IPC)**

**B60R 16/02** (2006.01)

**G07C 5/08** (2006.01)

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