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(71) Applicant *(for all designated States except US)*: **KONINKLIJKE PHILIPS ELECTRONICS N.V.** [NL/NL]; Groenewoudseweg 1, NL-5621 BA Eindhoven (NL).

(72) Inventor; and

(75) Inventor/Applicant *(for US only)*: **AUGERAY, Denis** [FR/FR]; c/o PHILIPS IP & S, Hight Tech Campus 44, NL-5656AE Eindhoven (NL).

(74) Agent: **UITTENBOGAARD, Frank**; IP & S-NL, Hight Tech Campus 44, NL-5656 AE Eindhoven (NL).

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(54) **Title:** METHOD OF REGISTERING A CORDLESS HANDSET BY A BASE STATION.

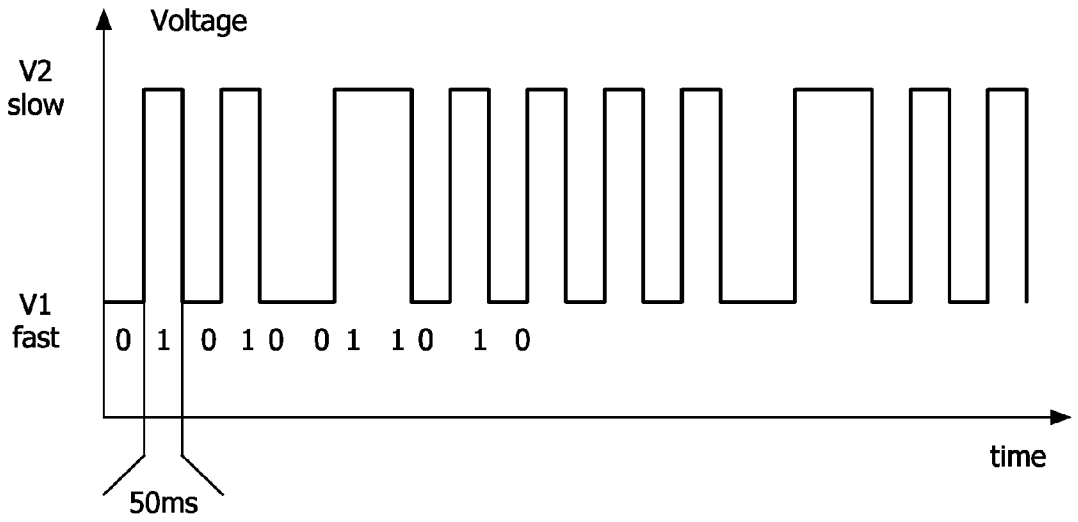

FIG. 3

(57) **Abstract:** The present invention relates to a cordless phone comprising a base station and a handset having an integrated battery wherein the base station has charging means for the integrated battery of the handset. Said cordless phone comprises: means for detecting if the handset is plugged into the base station, means for checking if the handset is already registered or not by the base station, and means for generating a fake charge signal for registering the handset if the handset is plugged into the base station and if the handset is not registered by the base station.

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Method of registering a cordless handset by a base station

FIELD OF THE INVENTION

The invention relates to a method of registering a cordless handset by a base station. The invention also relates to a cordless phone comprising a base station and a handset having an integrated battery wherein the base station has charging means for the integrated battery of the handset.

BACKGROUND OF THE INVENTION

Cordless handsets require to be subscribed to a base station before being operational.

There are several known methods of registering a cordless handset to a base station.

According to a conventional method, a user has to enter a pin code on the handset, and then to launch the manual subscription mode via the menu available on the handset and/or the base station, and finally to wait several seconds till the subscription process terminates. This subscription process requires several operations from the end-user and uses the radio frequency transmission/reception units of the handset and of the base station.

According to another method, the user has to plug the handset into the base station and wait for several seconds for the completion of the subscription. This method does not require specific operations via a menu as previously described but requires an additional data mode between the base station charge contact and the handset charge contact. According to said another method, the radio frequency transmission/reception units of the handset and the base station are not used. However, this additional data mode requires additional hardware means such as an opto-coupler on both the handset and the base station and software means and therefore introduces an additional cost for the cordless phone. The Siemens phone S450Y integrates such an additional data mode. Furthermore, the registration of a handset cannot be performed when communication takes place via the base station.

SUMMARY OF THE INVENTION

It is an object of the invention to propose a method of subscription between a cordless base station and a cordless handset and a cordless phone comprising a base station and a handset, which is both simple for the end user and cost effective.

To this end, the method of registering a cordless handset by a base station in accordance with the invention is characterized in that it comprises the steps of:

- detecting if the handset is plugged into the base station,
- checking if the handset is already registered or not by the base station, and
- generating a fake charge signal for initiating a registration of the handset if the handset is plugged into the base station and if the handset is not registered by the base station.

As a consequence, the method in accordance with the invention simply uses a fake charge signal between the base station and the handset instead and does not require an additional dedicated data mode for initiating the registration process. It also does not require specific transmitting/receiving means such as opto-couplers. Finally, thanks to the use of this charge signal, communication is still allowed during the registration process.

The invention also relates to a cordless phone comprising a base station and a handset having an integrated battery wherein the base station has charging means for the integrated battery of the handset, said cordless phone comprising:

- means for detecting if the handset is plugged into the base station,
- means for checking if the handset is already registered or not by the base station and
- means for generating a fake charge signal for initiating a registration of the handset if the handset is plugged into the base station and if the handset is not registered by the base station.

The invention also extends to a computer program product comprising a set of instructions which, when loaded in the memory of a cordless phone, makes the cordless phone execute all the steps of the subscription method.

These and other aspects of the invention will be apparent from and will be elucidated with reference to the embodiments described hereinafter.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will now be described in more detail, by way of example, with reference to the accompanying drawings, wherein:

- Fig. 1 shows an overview of the protocol in accordance with the invention;
- Fig. 2 is a block diagram showing the registration process according to the invention for the base station and for the handset;
- Fig. 3 shows the fake charge signal between the base station and the handset, which is used for the registration process in accordance with the invention; and
- Fig. 4 shows an example of implementation of the circuit for detecting the fake charge signal in the base station.

DETAILED DESCRIPTION OF THE INVENTION

The invention relates to a method of subscription between a cordless base station and a cordless handset and to a cordless phone comprising such a base station and such a handset. Said cordless phone is in the following example of the DECT (for Digital Enhanced Cordless Telephone) type but it would be apparent to a skilled person that the cordless phone can be any other cordless phone such as a Voice Over Internet Protocol VOIP phone, using any transmission protocol other than the DECT standard.

Referring to Fig. 1, an overview of the registration protocol according to the invention is described. An unregistered handset 1 is plugged into a base station 2. A handset software application detects that it has been plugged into the base station and checks for an "in range status". If an "in range status "is found, it means that the handset is already registered and that the registration process is not required.

Then the handset generates an alternate slow charge/fast charge signal 10. The slow charge signal is usually used for keeping the battery fully charged at the end of a charging cycle while the fast charge signal is usually used from the beginning of a charging cycle up to the completion. Both charge signals are constant/static during the considered charge mode. It will be apparent to a skilled person that charge modes other than the slow charge/fast charge modes can be used.

According to the invention, the alternate slow charge/fast charge signal is a fake charge signal, which is not used here for battery charging purpose but only for notification to the base station that a plugged handset is asking for registration. This signal is a conducted voltage between the two charging plugs of the handset and the base station. An example of charge signal will be given in the following.

Then the base station detects this slow charge /fast charge signal and switch itself in the registration mode. Then a conventional registration process 11, such as for example the one defined in the DECT standard is performed until the completion of the subscription. At the end of the registration process, a subscription code 12 having for example the value "0000" is sent by the handset to the base station permitting a registration without any manual operation from the user. If another value than "0000" is set then the user has to manually enter the suitable subscription code from the handset.

Fig. 2 describes the registration method in accordance with the invention.

In a step 100, the handset is ready for use with a battery charged or not charged inside. The base station is properly powered and comprises charging means for the integrated battery of the handset.

In a step 110, the handset is plugged into the base station.

In a step 120, an "in range" status is performed. In more details, the handset checks if a base station already registered in its memory is in its radio frequency range. To this end, a RFPI (for Reference Fixed Part Identification, which is the unique identifier of a base station) is broadcasted by a base station. The handset searches for a known RFPI in its memory based on the reading the RFPI received by its radio frequency unit. If an "in range status "is found (y), it means that the handset is already registered and a registration process is not required. In this case a step 121 follows corresponding to the end of the process. A handset registration self-test can also be performed instead of the "in range " test.

In a step 210, the base station checks if a handset is plugged into the cradle and checks if there is a voltage between the charging plugs. This information read on the Input/Output Central Processing Unit I/O CPU pin. If not then a step 211 follows corresponding to the end of the process.

In a step 130, a circuit for controlling the battery charge of the handset generates a slow charge /fast charge signal. Fig. 3 shows an example of the waveform of the fake charge signal between the base station and the handset. The fake charge signal is a predetermined binary sequence of values "1" and "0", the value "0" corresponding to a first voltage V1, V1 being the fast charge level, and the value "1" corresponding to a second voltage V2 higher than V1, V2 being the slow charge level. The predetermined binary sequence (for example a code having 12 bits 010100110101 as shown on Fig. 3) is transmitted several times and has to be detected by the base station. The bit duration is for example 50 ms and has to be higher than the delay introduced by a detection circuit integrated in the base station, said delay being in the example of Fig. 4 10 ms.

In a step 220, the handset is plugged into the base station and the base station checks for the slow charge/fast charge signal. In our example, this signal is generated by the handset and is a voltage signal between the 2 charging plugs CH+ and CH- of the handset and the base station. The slow/fast charge signal is detected by the detection circuit of Fig. 4. Said detection circuit comprises a single transistor T of the N type used preferably in a non-linear mode (blocked/saturated). The base of the transistor is connected to a voltage divider. The transistor is saturated during the time limit for which the charge signal is equal to V1 and is blocked during the time limit for which the charge signal is equal to V2. The output signal

available on the collector of the transistor is connected to a GPIO (for General Input Output Port) of a baseband processor. The GPIO is configured according to an input mode. The signal available on this input is analyzed by a software routine allowing for a comparison between the received binary sequence and the binary sequence recorded in the base station memory. This method permits to recognize the range of compatible handsets for a base station. This software routine is executed by the baseband processor in order to detect the slow charge/fast charge signal code. There is no hardware implementation required by the invention on the handset side. If the fast/charge signal is not detected, than the process ends with step 221.

If the slow charge/fast charge is detected by the base station then a conventional registration process such as the wireless registration process depicted in the DECT standard EN 300 175-5 §5.6.5 & EN 300 444 (GAP) § 8.30 is used in a step 230. As a consequence, the base station is set in a registration mode.

In a step 140, the handset searches using a software application for a base station in registration mode for a predetermined amount of time. If no detection occurs within this predetermined amount of time, then the registration process ends in a step 141.

In a step 150, the software application has found a base station in registration mode and informs the base station accordingly.

In a step 240, the base station waits during a predetermined of time for the information according to which the handset has found a base station in registration mode. If the base station has not been informed by the handset after a predetermined amount of time then the registration process ends in a step 241. If the base station has been informed by the handset, then the conventional registration process is launched on the base station in a step 250 until completion in a step 251.

In a step 160 the software application checks if the allowed subscription code is automatically set to '0000', and if so the conventional registration process such as the one defined in the DECT standard is launched on the handset in a step 190 until completion in a step 191.

If the subscription code is not '0000' then the end-user has to manually enter the suitable subscription code via the handset keyboard according to a message displayed on the handset "Enter PIN code" in a step 170. Step 180 checks if the subscription code is correct. If not then the message "Enter PIN code" is displayed. If the end user is unable to enter the suitable subscription code after a given number of tries, then the registration process is

aborted in a step 171. If the subscription code is correct, then the registration process is launched until completion according to steps 190 and 191 previously described.

As a result, the subscription method invention uses the radio frequency units of the base station and the handset and uses the charging mode signalization between the base station and the handset instead of the dedicated data mode via the charging plugs. The invention requires software implementation in the handset and in the base station. No hardware implementation on the handset and only a limited hardware implementation is required on the base station. Furthermore the registration process and a communication via the base station are possible.

Moreover, the capability management of the link allowed to be simultaneously performed is not affected by the implementation of the invention. The three links usually allowed to be used simultaneously are:

- the registration link,
- the distant communication via the external network (e.g. Public Switched Telephone Network PSTN) with a remote party,
- the conf call mode (one extra handset introduced in an existing distant communication).

Those links are not affected because the hardware and software resources used are light. It means that the registration mode according to the invention is not an exclusive mode and therefore communications are allowed during the registration mode according to this invention.

It should be noted that the above-mentioned embodiments illustrate rather than limit the invention, and that those skilled in the art will be capable of designing many alternative embodiments without departing from the scope of the invention as defined by the appended claims. In the claims, any reference signs placed in parentheses shall not be construed as limiting the claims. The word "comprising" and "comprises", and the like, does not exclude the presence of elements or steps other than those listed in any claim or the specification as a whole. The singular reference of an element does not exclude the plural reference of such elements and vice-versa.

The invention may be implemented by means of hardware comprising several distinct elements, and by means of a suitably programmed computer. In a device claim enumerating several means, several of these means may be embodied by one and the same item of

hardware. The mere fact that certain measures are recited in mutually different dependent claims does not indicate that a combination of these measures cannot be used to advantage.

CLAIMS

1. A method of registering a cordless handset by a base station, comprising the steps of:

- detecting if the handset is plugged into the base station,
- checking if the handset is already registered or not by the base station, and
- generating a fake charge signal for initiating a registration of the handset if the handset is plugged into the base station and if the handset is not registered by the base station.

2. A method as claimed in claim 1, wherein a default subscription code is automatically allocated to the handset for registering said handset.

3. A method as claimed in claim 1, wherein a subscription code is manually entered by a user of the handset for registering said handset.

4. A cordless phone comprising a base station and a handset having an integrated battery wherein the base station has charging means for the integrated battery of the handset, said cordless phone comprising:

- means for detecting if the handset is plugged into the base station,
- means for checking if the handset is already registered or not by the base station, and
- means for generating a fake charge signal for initiating a registration of the handset if the handset is plugged into the base station and if the handset is not registered by the base station.

5. A cordless phone as claimed in claim 4, wherein the base station comprises a detection circuit for detecting the fake charge signal.

6. A cordless phone as claimed in claim 5, wherein the detection circuit comprises a transistor operating in a non-linear mode.

7. A cordless phone as claimed in claim 6, further comprising a processor wherein the output of the collector of the transistor is connected to the input of the processor.

8. A cordless phone as claimed in claim 4, wherein the fake charge signal is a predetermined binary sequence corresponding to an alternate signal between two charge modes.

9. A computer program product comprising a set of instructions which, when loaded in the memory of a cordless phone, makes the cordless phone execute all the steps of the method as claimed in claim 1.

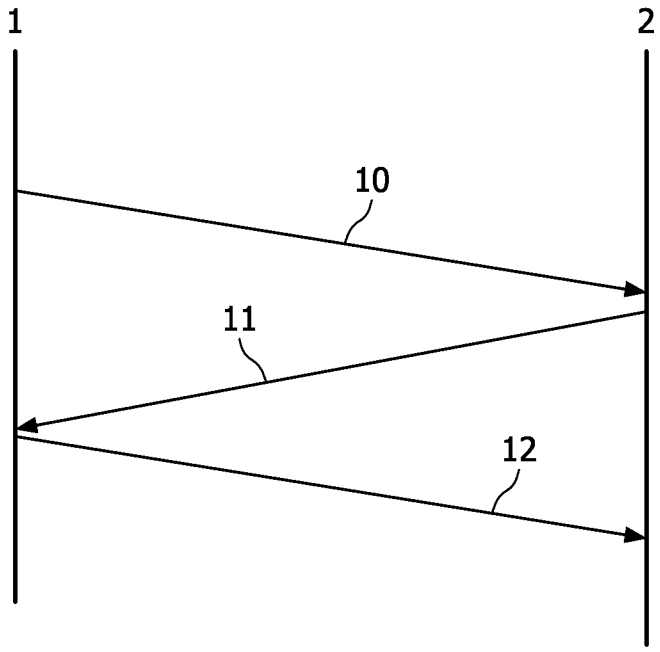

FIG. 1

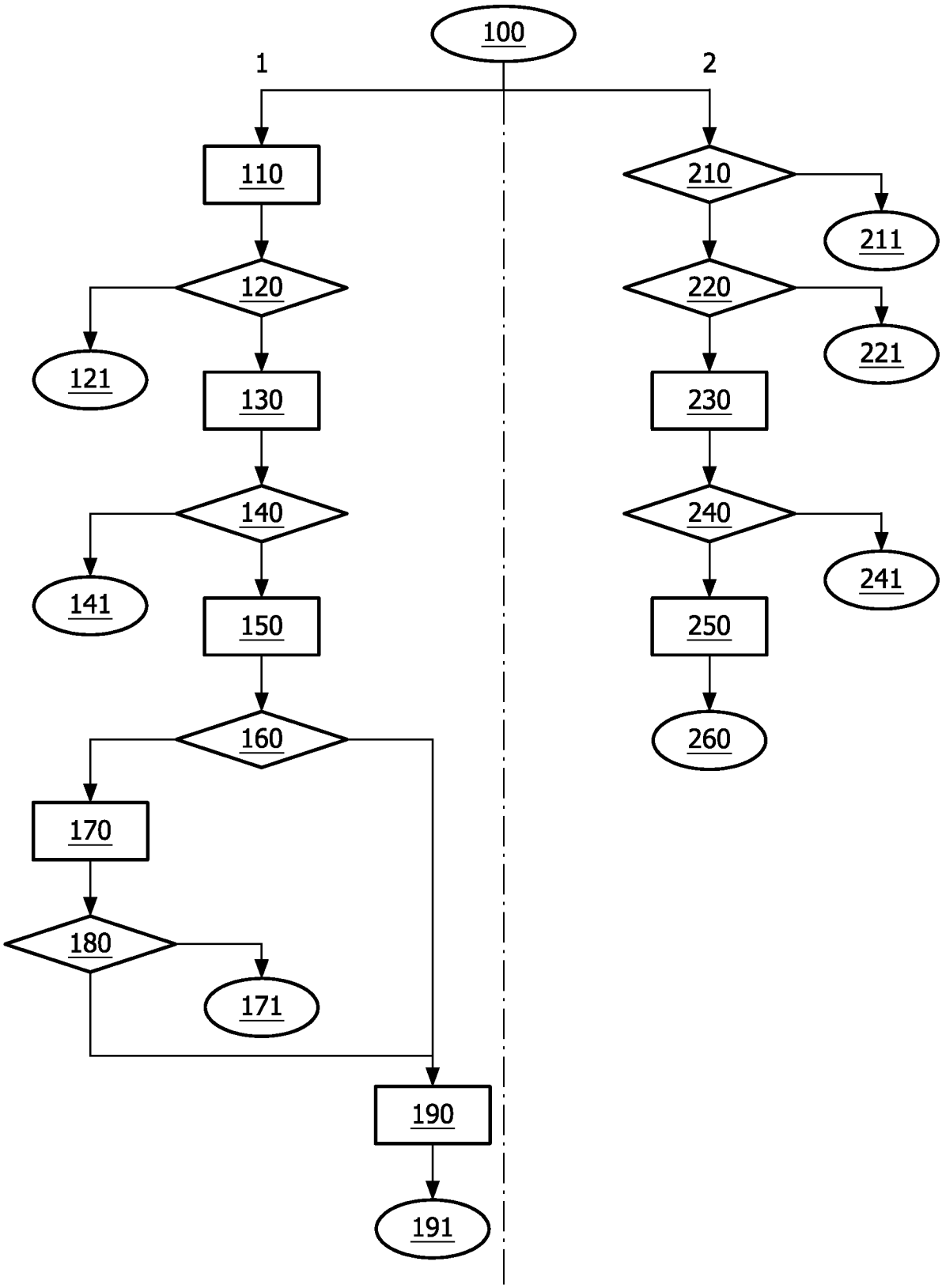
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FIG. 2

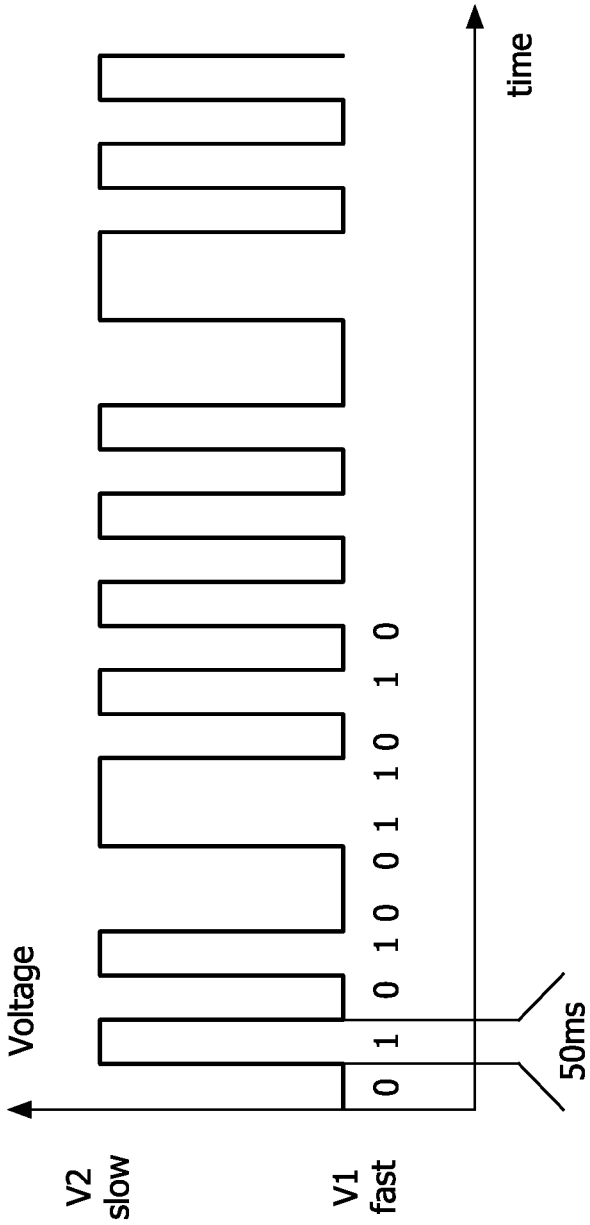

FIG. 3

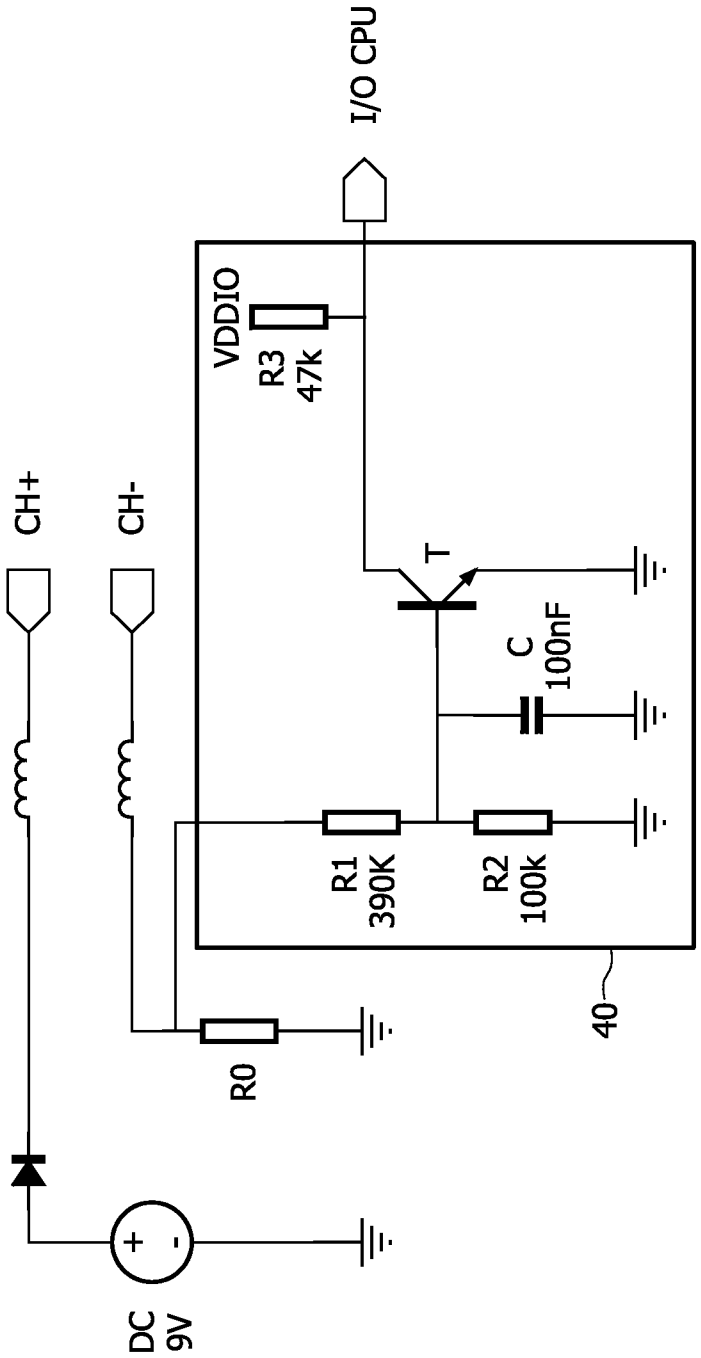

FIG. 4

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2008/053542

A. CLASSIFICATION OF SUBJECT MATTER
INV. H04M1/727

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)
H04M

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

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 731 813 A (SCHROEDER DANIEL R [US]) 15 March 1988 (1988-03-15) column 1, lines 43,44 column 2, lines 23-27 column 4, lines 45-58 column 5, lines 42-45 column 6, lines 30-40; figure 3	1-9
X	US 2004/185917 A1 (FISCHEDICK THOMAS [DE] ET AL) 23 September 2004 (2004-09-23) paragraphs [0003], [0034], [0035], [0043], [0052]	1-5,8,9

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
5 December 2008	11/12/2008

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Amorotti, M

INTERNATIONAL SEARCH REPORT

International application No
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		WO 03003702 A1	09-01-2003
		EP 1400096 A1	24-03-2004