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(54) Card reader device and method for triggering an event in such a device

(57) In the case of a telephone device that has a card reader for prepaid cards, each prepaid card is checked if its card value has reached zero (Step 22). During this process, it is checked whether the card belongs to a specific card group (Step 26). If yes, a serial number of the card is compared with a list stored in the memory of the device (Step 28), and it is determined, in this manner, whether a specific event is supposed to be triggered. This event can be, for example, display of a lottery prize or some other incentive.

[Fig. 5 Translation Key:]

20 = Check the group of the card

22 = Authorized group?

nein = no

24 = Compare the serial number of the card with the list

36 = On list

28 = Check the value of the card

30 = Value = 0?

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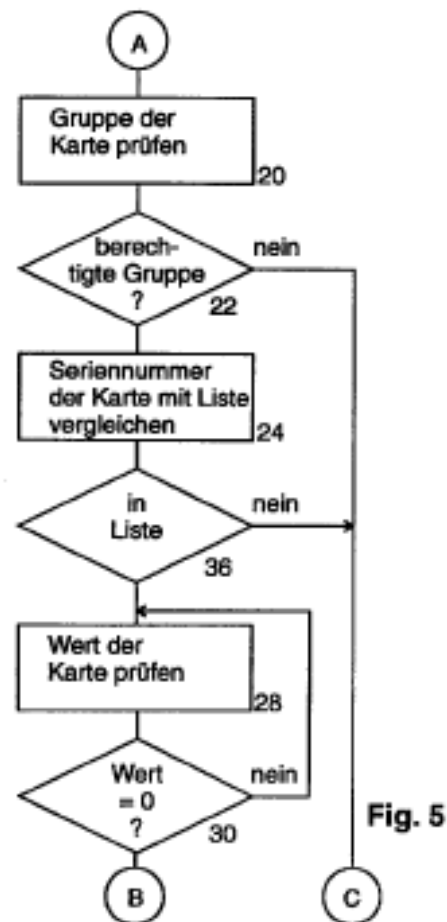


Fig. 5

Specification

The invention relates to a card reader device and to a method for triggering an event in such a device, in accordance with the preambles of the independent claims.

Card reader devices of this type are used, for example, in telephone devices, so as to read prepaid cards and to reduce their value. In this process, the value of the card is reduced in accordance with the fees that are incurred, until the value of the card is reduced to zero. Normally, cards with a zero monetary value only have value for collectors, unless the cards can be recharged.

Against this background, the task arises of configuring the reader devices and the cards in such a manner that new applications open up and thereby customer acceptance is increased.

This task is accomplished by the object of the independent claims.

According to the invention, it is therefore checked whether the value of the card lies in a specific range or has reached a target value, and, at the same time, whether it belongs to a specific subgroup of all possible cards. If these two conditions are met, then a specific event is triggered. This event can be, for example, a surprise for the user, particularly the information whether or not the user has achieved a lottery prize.

Preferably a serial number memory is placed in the card, which can be checked by the reader device. In this connection, the event is only triggered if it is determined, on the basis of the serial number, whether the card belongs to the subgroup. For this purpose, the final digits of the serial number can be compared, for example, with a table that is stored in the reader device. In this regard the serial number is a number that is different for each individual card, or that is at least used only by a small number of cards at the same time.

In addition to a serial number, a group memory can be provided in the memory of the card, which states whether the card is even authorized to trigger the event. Such a group memory requires only a single bit or a few bits, and allows reliable checking of the card authorization even if it cannot be determined on the basis of the serial number alone whether the card can trigger the event. In particular, it is not necessary that all of the potentially authorized cards possess serial numbers having specific characteristics.

Preferably the value-checking and selection step is carried out independently of whether the value memory has previously been changed in the same reader device. This has the advantages that not all the reader devices need to be able to carry out the aforementioned steps. For example, if the value of the card is reduced in a device that cannot trigger the event, then the user can check it later in a device that is set up for carrying out the required steps.

Further preferred embodiments and applications of the invention are evident from the dependent claims and from the following description, using the figures. These show:

Figure 1, a card for use in the method according to the invention,

Figure 2, a simplified block diagram of a card reader device in the form of a telephone device,

Figure 3, a detail of the memory of the card,

Figure 4, a detail of the memory of the card reader device,

Figure 5, the process of checking a card, and

Figure 6, a possible method of procedure when triggering the event.

First of all, one of the possible embodiments of the invention will be explained using the figures. Further possible embodiment variants will be discussed at the end of the description.

The embodiment shown in the figures is an application in the sector of telephone devices. In particular in the public sector, such devices are often equipped with a card reader. For operating the device, a prepaid card must be inserted into this reader. The prepaid card possesses a memory that can be optical or electronic, for example, and indicates the current card value. During a call, the fees incurred are charged, and the value of the card is reduced. Common cards of this type are described, for example, in the ISO Standard 7816 and the ETSI Standard PrEN 726. Cards of this type are used as "postcards" or credit cards, for example.

Such a card is shown in Figure 1. It possesses contacts for the card reader, which are connected with a memory chip in the interior of the card. As a rule, the card has an inscription 2; in the present case, it also has an imprinted serial number 3.

Figure 2 shows the basic structure of a telephone device that has a card reader 4. The device comprises a controller 5, which accesses data in a memory 6. To operate the device, a keyboard and a display 7 are provided. The controller 5 controls the function of the telephone part 8, which comprises the elements that give the device its actual telephone functions, such as a handset and suitable interface circuits for connecting to the telephone network 9. Furthermore the telephone part also comprises a modem, by means of which the controller 5 can exchange binary data by way of the telephone network 9.

Before discussing the method of functioning of the device and of the card from a technical point of view, the desired capabilities from the user's point of view will be briefly discussed below.

In the present case, it is supposed to be possible for the user to acquire two different types of cards. The first type involves conventional cards that possess a specific initial value. The card value is reduced in a known manner when telephoning, until the card value is reduced to zero. After that time, the card at most has value for a collector.

The second type of cards involves lottery ticket cards. These cards are also provided with a specific value at the beginning, which value is reduced in accordance with the charges incurred while telephoning. However, as soon as the value of the card has been reduced to zero, it acts as a lottery ticket.

When the telephone device recognizes a lottery ticket card having a value reduced to zero, it checks whether this card is authorized for a prize. If yes, the user is informed of this in a suitable manner.

The technical implementation of this concept is evident from Figures 3 to 6.

In Figure 3, the memory of the card is shown in a simplified manner. This involves a non-volatile memory that is divided up into two regions 10 and 11. Values that can no longer be changed after the card is sold are contained in the region 10, while the data in the region 11 can still be changed, at least to a restricted extent, by the reader device of the telephone.

In the protected region 10, a serial number memory 12 is provided. This memory contains a serial number that is different for each card, or one that at least only a few cards possess. These numbers can involve digits with which the card manufacturer numbers the cards of a shipment in ascending order. As shown in Figure 1, the serial number can additionally be imprinted on the outside of the card.

Furthermore, a group memory 13 is provided in the protected region. This memory indicates whether a card is a lottery ticket card or a conventional card. This information is particularly important if it cannot be determined on the basis of the serial number alone whether or not a card is a lottery ticket card. The group memory requires only a few bits.

There is a value memory 14 in the unprotected (or only partially protected) region 11 of the memory of the card, the value of which memory is reduced by the reader device in a known secured manner, in accordance with the charges incurred.

Figure 4 shows a detail of the memory 6 of the reader device. In this region, there is a list of the serial numbers that are authorized for a prize. In a first part 16 of the table, for example, those serial numbers that represent a prize of CHF 100.00 are recorded. In the case of the present example, these serial numbers are characterized in that their last three digits are 235, 421 or 991. There is a corresponding list of final digits for serial numbers that are authorized to receive a prize of CHF 1,000.00 in the part 17 of the table. In the last part 18, there is a list of the serial numbers authorized to receive one of the top prizes.

Of course the table according to Figure 4 shows only one of the many possibilities as to how the serial number can be evaluated and the corresponding information can be stored.

Preferably the data in the table according to Figure 4 are present in encrypted form, so as to reduce the risk of unauthorized reading, for example in the case of a stolen card reader device.

When a card is inserted into the reader device, or when the value of the same card is reduced to zero while telephoning, the steps that are shown in summary in Figures 5 and 6 are carried out.

In the first step 20, the group memory 13 of the card is read. If the card is not a lottery card on the basis of this value (Step 22), checking is stopped at Point C and the card is used as a normal prepaid card.

In Step 24, the serial number from the corresponding serial number memory 12 is compared with those contained in the table according to Figure 4. If the number does not meet the prize criteria (Step 26), checking is stopped at Point C.

In Step 28, the card value in the value memory 14 is checked after every debiting, if necessary repeatedly. If the card value has not yet reached 0 (Step 22), checking is stopped at Point C. Otherwise an event is triggered at Point B.

In this regard, the sequence shown in Figure 6, for example, can be involved, in which the user is informed of the corresponding prize on the display 7 (Step 32). However, it is also conceivable that the device then automatically produces a telephone connection with the central office of the lottery operator (Step 34), with the winner being informed how he can get his prize, for example by sending his card to the lottery operator or exchanging it for the prize at a designated location. Preferably, a different event is triggered depending on the prize to which the user is entitled, for example in that a text adapted to the prize is displayed on the display 7.

The table according to Figure 4, i.e. the corresponding evaluation algorithm, can be permanently stored in the device. However, this has the disadvantage that fraudsters could determine, by means of albeit complicated investigations, which of the cards is entitled to a prize.

In order to reduce this problem, the numbers authorized to receive a prize can be changed periodically. Preferably, for this purpose the value of the table according to Figure 4, i.e. the corresponding evaluation algorithm, could be updated accordingly by means of reprogramming the terminal.

It is also conceivable that a decision as to whether a card is entitled to a prize is made not only on the basis of the final digits of the serial number. The risk of decryption is reduced by means of the use of a complicated algorithm, and this makes it more difficult for a fraudster to recognize prize cards.

Fundamentally, the serial number can be transformed mathematically by means of any suitable algorithm, whereupon the transformed value is then checked with regard to specific criteria. For example, a hash value, for example a horizontal checksum, can be generated on the basis of the serial number, by means of a suitable algorithm, with a prize being indicated if the hash value has a predetermined size.

However, the entitlement of a card to a prize does not necessarily need to be encrypted in the card number. It is also conceivable that corresponding information is explicitly written into the protected part 10 of the card memory. This information can comprise, for example, a telephone number that is called in the event of a prize of a specific amount or displayed to the user.

It is also conceivable that instead of following Steps 28 and 30, the reader device decides, on the basis of a random algorithm, whether the card is supposed to be entitled to a prize. The result is written into the card in an unchangeable manner, and the user

is informed of it. However, in this case very high prize amounts should not be used, on the basis of statistical considerations.

As has already been mentioned, the card can be a prepaid card that can only be reduced in value to zero once. However, a chip card that is rechargeable can also be used. In this case, the user can say, for example when recharging his card, whether he wants to pay an additional fee that entitles him to participate in the lottery. If yes, the group memory 13 of the card is set accordingly, and the card becomes a lottery ticket card.

The invention is not just suitable for use in telephone devices. It is also conceivable to equip other devices with a corresponding function, for example self-service gas station pumps, beverage vending machines, etc.

Instead of displaying a lottery prize, the lottery ticket card can also trigger a different event, for example:

- free-of-charge distribution of an article (for example in the case of a vending machine),
- a one-time credit to the card,
- issuance of a lottery number between 1 and 13, with the user only becoming entitled to a prize if he has received a total of three of the same lottery numbers from different cards,
- issuance of an advertising text that encourages him to purchase a new card from the same vendor and offers a rebate,
- etc.

In that the corresponding events are only triggered when the value of the card has dropped to a predetermined level (for example 0) or a certain value range, the risk of abuse is reduced, and furthermore an incentive is offered for using up the card as soon as possible.

Claims

1. A method for triggering an event in a card reader device for prepaid cards (1), in particular in a telephone apparatus, wherein the prepaid cards (1) have a value memory (14) for storing the card value, characterized by the following steps:

a value-checking step (20, 22), in which the content of the value memory (14) of an inserted card is compared with a specific value range or a specific target value, and

a selection step (24 - 30), in which it is checked whether the inserted card belongs to a specific subgroup of the cards intended to be reduced in value to zero, wherein, if both the value-checking step (20, 22) and the selection step (24 - 30) yield a positive result, the event (32, 34) is triggered.

2. The method according to claim 1, characterized in that the card has a serial number memory (12), the value of which is checked by the card reader in the selection step.
3. The method according to claim 2, characterized in that the card has a group memory (13) in addition to the serial number memory (12), the value of which is checked by the card reader in the selection step, wherein the event is only triggered if the group memory has a predetermined value, in such a manner that independent of the value of the serial number memory (12), the event can be triggered only with part of the readable cards.
4. The method according to any one of claims 2 or 3, characterized in that a table (16 - 18) of serial numbers is provided in the card reader device, which table is compared with the value of the serial number memory.
5. The method according to claim 3, characterized in that the value of the serial number memory (12) is mathematically transformed in the selection step (24 - 30), and that the transformed value is checked using a predetermined criterion.
6. The method according to any one of the preceding claims, characterized in that the card reader device is connected with a telephone network (9), and that when the event is triggered, a connection is produced by way of the telephone network (9).
7. The method according to any one of the preceding claims, characterized in that the card reader device has a display (7) that indicates that the event has been triggered.
8. The method according to any one of the preceding claims, characterized in that when a card is inserted into the card reader device, at least the value-checking step and/or the selection step is/are always carried out, independent of whether the value of the value memory (14) was previously changed by the card reader device.
9. The method according to any one of the preceding claims, characterized in that depending on the result of the selection step, one of several events is selected.
10. The method according to any one of the preceding claims, characterized in that an event memory is provided in the card, which indicates whether an event is to be triggered,

and, if applicable, which of the events is to be triggered.

11. The method according to any one of the preceding claims, characterized in that it is checked during the value-checking step (20, 22) whether the value of the card has been reduced completely to zero.
12. A card reader device, preferably a telephone device, for carrying out the method according to any one of the preceding claims, characterized in that it has value-checking means for comparing the value memory (14)

of a card with a specific value range or target value, as well as selection means for determining whether a card belongs to a specific subgroup of the cards intended to be reduced in value to zero, as well as triggering means that trigger the event on the basis of confirmatory results of the value-checking means and selection means.

- 10 13. The card reader device according to claim 13 [sic], characterized in that it is designed for carrying out the method according to any one of claims 2 - 11.

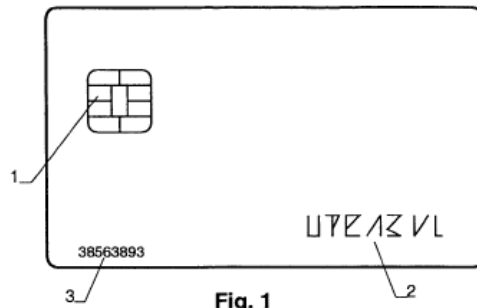


Fig. 1

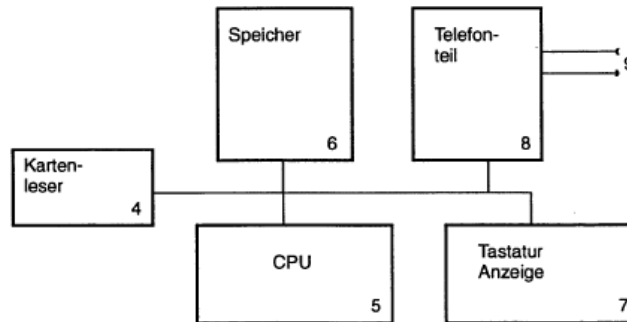


Fig. 2

[Fig. 2 Translation Key:]

4 = card reader

5 = CPU

6 = memory

7 = keyboard, display

8 = telephone part

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