(12) UK Patent Application (19) GB (11) 2 180 677 (13) A

(43) Application published 1 Apr 1987

(21) Application No 8520196

(22) Date of filing 12 Aug 1985

(51) INT CL[4]
G06K 19/00

(52) Domestic classification (Edition I)
G4H 13D 14A 14D TG

(56) Documents cited
GB A 2015221
GB 1543601
GB 1505715
EP A1 0060650
US 3906460

(58) Field of search
G4H
G4V
Selected US specifications from IPC sub-classes G06K
G07F

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(54) Card and card system

(57) A card for use in credit control and security, displays a message indicating the invalidity of the card when it recognises its own number among numbers transmitted by radio.

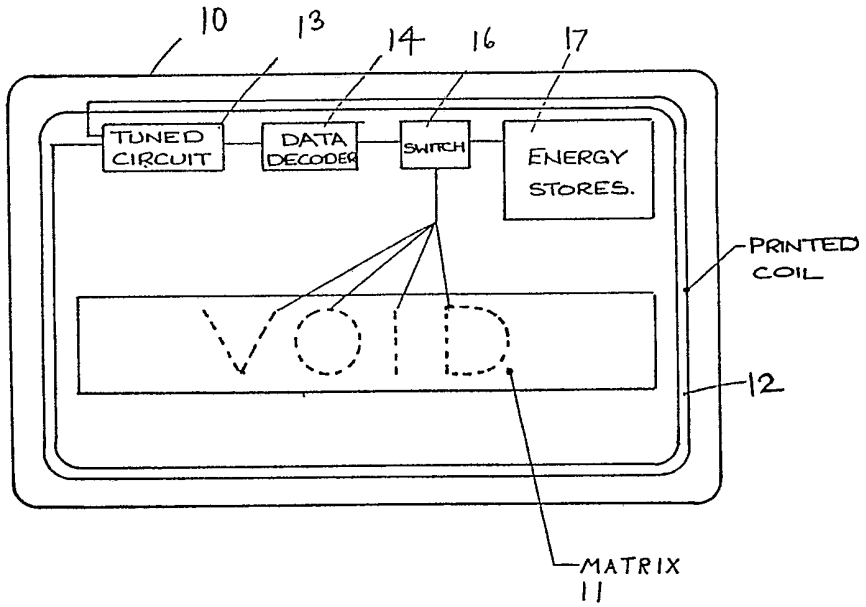

FIG 1.

GB 2 180 677 A

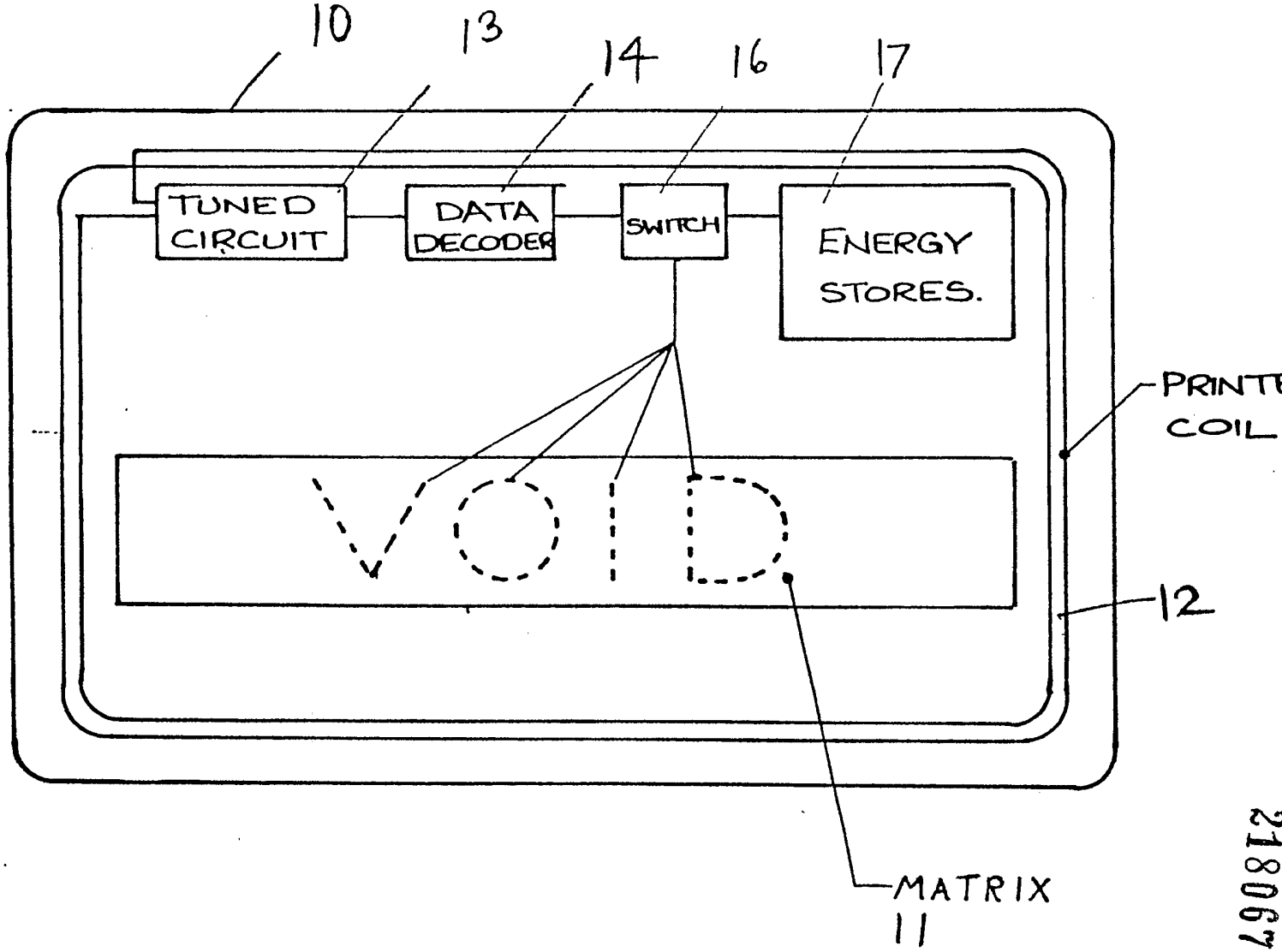

FIG 1.

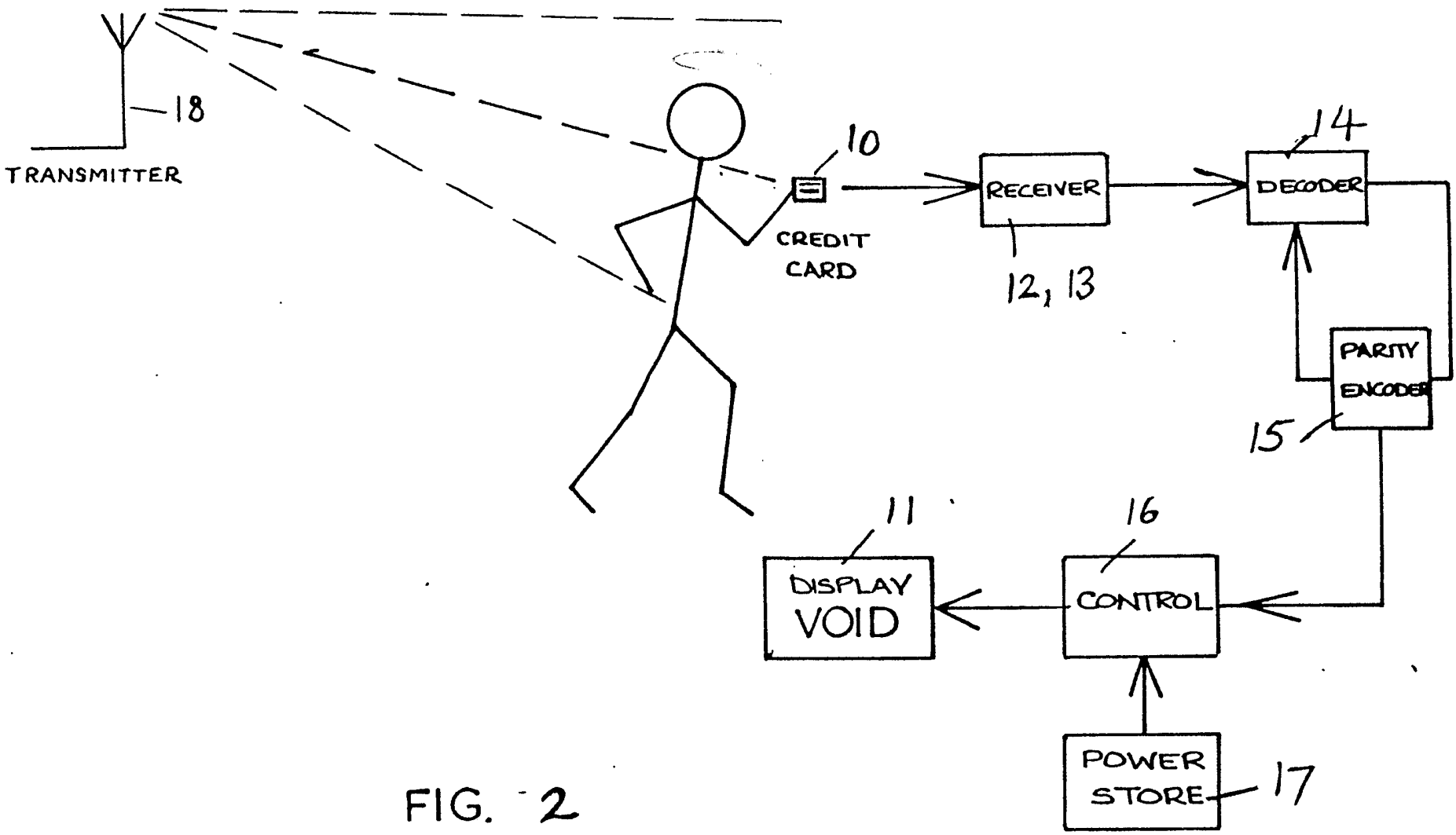
18
TRANSMITTER
10
CREDIT CARD
RECEIVER
12, 13
14
DECODER
PARITY ENCODER
15
11
DISPLAY VOID
16
CONTROL
POWER STORE
17

FIG. 2

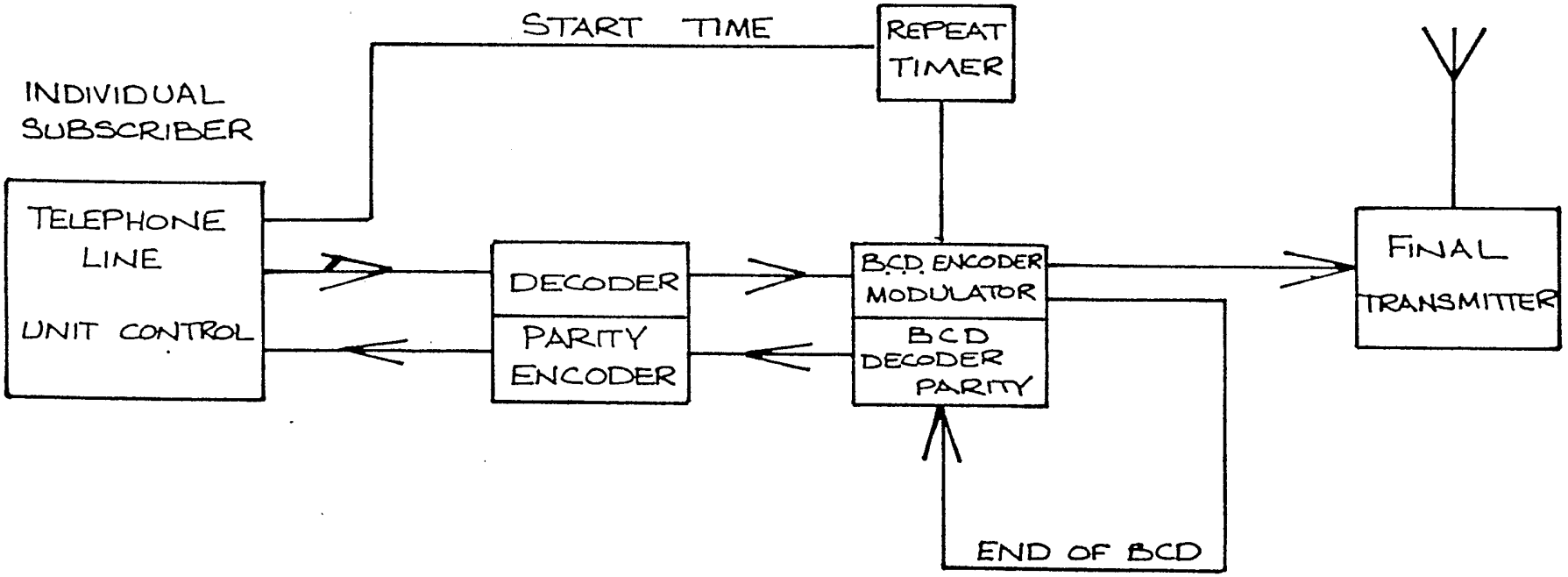
START TIME
REPEAT TIMER
INDIVIDUAL SUBSCRIBER
TELEPHONE LINE
UNIT CONTROL
DECODER
PARITY ENCODER
B.C.D. ENCODER MODULATOR
BCD DECODER PARITY
FINAL TRANSMITTER
END OF BCD

FIG. 3

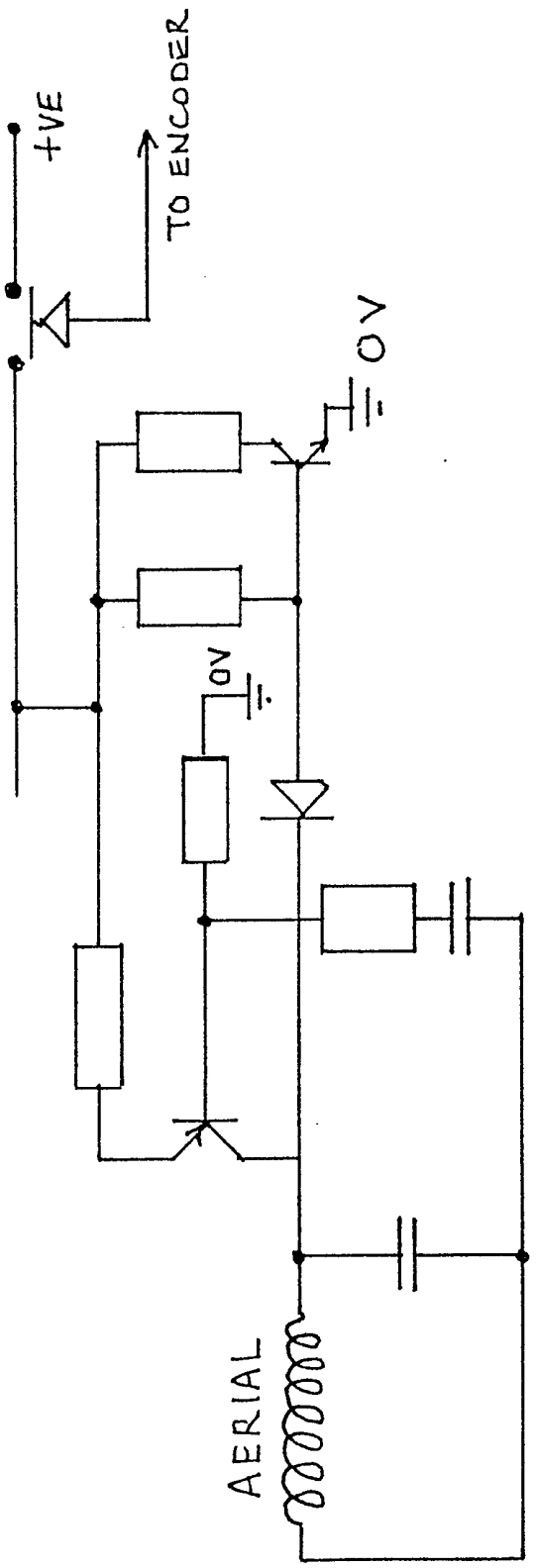

FIG4

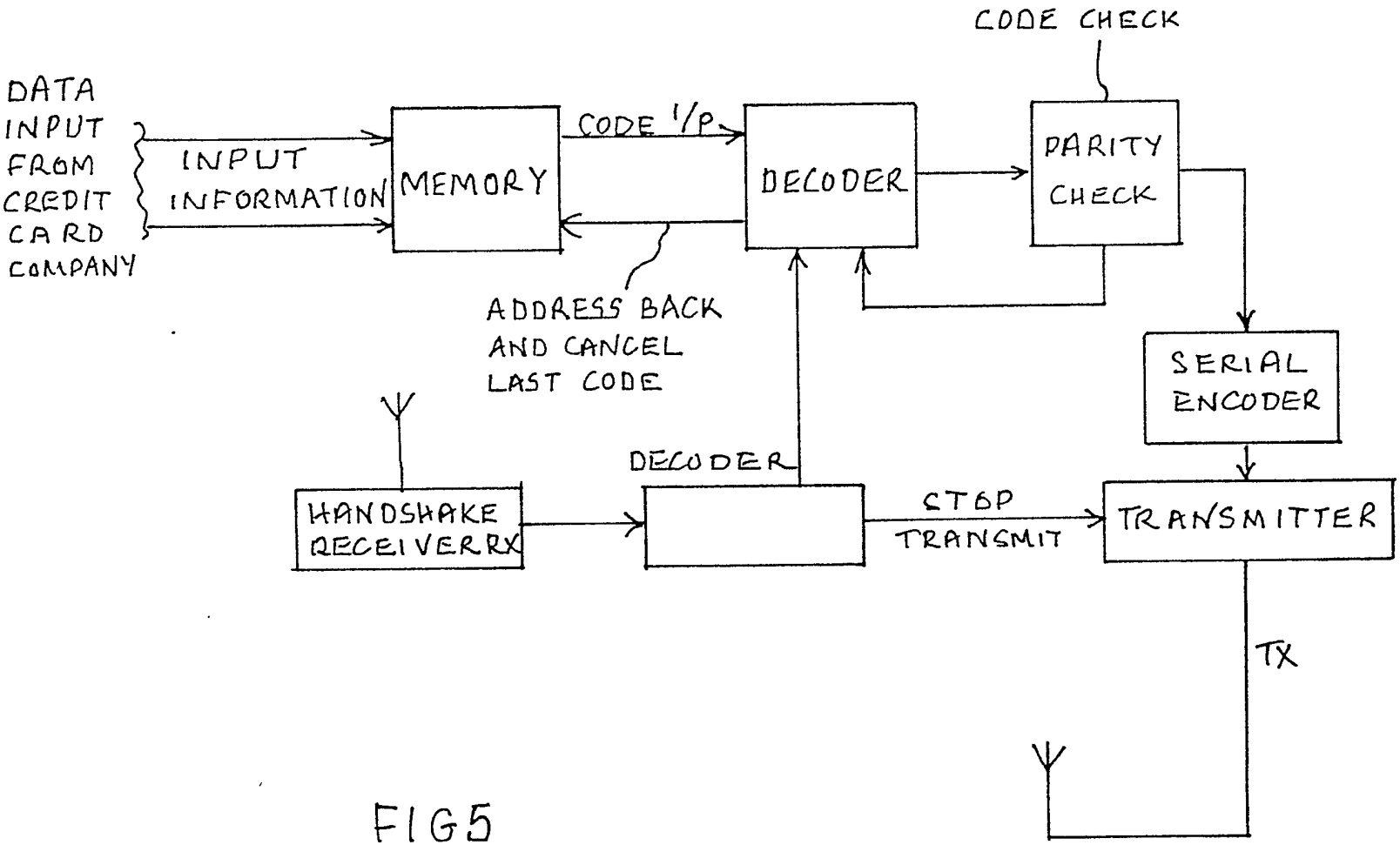
CODE CHECK
DATA INPUT FROM CREDIT CARD COMPANY
INPUT INFORMATION
MEMORY
CODE I/P
DECODER
PARITY CHECK
ADDRESS BACK AND CANCEL LAST CODE
SERIAL ENCODER
DECODER
HANDSHAKE RECEIVERRX
CTSP TRANSMIT
TRANSMITTER
TX

FIG5

SPECIFICATION

Card and card system

This invention relates to a card and/or card system.

The invention relates to a card such as a credit card (ie a card which enables a customer to purchase goods on credit eg VISA or Access), a charge card (a card which allows a customer to purchase goods on credit for a limited period of time eg American Express or Diners), an authorisation card (a card which enables the holder to, for example, withdraw cash from a suitable machine, operate a car park barrier or undo a lock) or a card which is purchased for a certain amount of money and is then used for various purchases, the amount of money recorded in the card being reduced by each purchase. Although generally all of such cards are flat plastic cards there may be some variation in overall shape, particularly in respect of the so-called cards which are used to operate car park barriers and electronic locks.

All of said cards allow the user access to money or credit or to premises and are therefore useful and valuable. Theft and consequential use by unauthorised persons, or invalid use of said cards, has become a considerable problem.

The present invention provides, according to one aspect, a card as herein defined in which the card includes means to provide an indication that the card is not valid. The means to provide an indication may be, for example, wires which burn a visible indication on the surface of the card (such as the word "void" or "invalid") or may comprise an electronic display (such as an LED (light emitting diode)]. The electronic display may also be arranged to display the words "void" or "invalid".

The means to provide an indication that the card is not valid may be operated in a variety of ways. For example in the case of a conventional credit card, when the credit card is used and passed through a machine to authorise the purchase of a particular article, the machine may have inserted therein a list of the numbers of cards which are to be rendered invalid and may thereby operate on the card to produce the necessary indication.

However, the preferred method of operating the card to provide the indication will be described in accordance with the second aspect of the invention to follow. According to a second aspect of the invention, there is provided a card control system comprising and one or more transmitters and cards as herein defined each including a receiver, the cards each carrying a unique code, the transmitter transmitting the code of invalid cards and the cards, on receipt of such a signal, being invalidated. Thus in a preferred arrangement to be described the cards will each include a radio frequency receiver, electronic logic, and an electronic indicator, and transmitters will be provided for various localities, for example shops where the card is to be used, and the card, on entering the area in which a signal may be received from the transmitter will receive therefrom coded information. If the coded number or information received by a particular card corresponds to the unique code of the card then the electronic logic of the card will switch the electronic display so as to display an indication that the card is invalid, for example, by displaying the words "void" or "invalid".

A preferred arrangement of the invention will now be described by way of example only and with reference to the accompanying drawings in which:

Figure 1 is a front view of a card according to the invention showing a logic diagram of some of the electronic components within,

Figure 2 shows the card system in diagrammatic form,

Figure 3 shows a system by which an operator can cause the transmitter to transmit the code of a card to be invalidated,

Figure 4 shows a simplified circuit diagram of a transmitter, and,

Figure 5 shows a "hand-shake" transmitter for use in an alternative arrangement.

Referring to Figure 1 there is shown a card as hereinbefore defined which comprises a generally rectangular piece of plastic, generally comprising two or more sheets of plastic attached face to face. On the front surface of the card 10 is provided a display 11 in the form of a liquid crystal matrix. Embedded in the card is a receiver aerial 12 in the form of a printed coil, the receiver aerial being connected to a tuned circuit 13, the output of the tuned circuit 13 being passed to a data decoder 14. The output of the data decoder 14 is passed to a switch 16 which operates the liquid crystal matrix 11. Power is supplied by a battery 17. The battery is a flat battery and may comprise, for example, an ultra thin lithium battery CS1364 manufactured by Toshiba. The components 13, 14 and 16 may comprise solid state electronic components and the switch 16 is a standard type of switch circuit utilised to switch the individual components of a liquid crystal matrix to give a desired display of words.

The data decoder incorporates a memory and the memory includes a coded signal unique to the particular card.

Figure 2 illustrates a card system according to the invention. There is provided a radio transmitter 18 which transmits a series of coded signals which relate to the unique coded signals of those cards which are invalid. When the card 10 receives a signal from the transmitter in which the tuned circuit 13 and aerial 12 act as a receiver, the signal is passed to the decoder 14 where it is compared by means of the parity encoder 15 with the unique coded signal in the memory and if the two signals match then a signal is passed to the switch 16 to operate the liquid crystal matrix 11 to display the word "void".

In an alternative arrangement (not illustrated) in place of the liquid crystal matrix 11 there may be provided wires beneath the surface of the plastic which, will be connected to the battery when the card is to be invalidated, and thereby become heated and will burn in the surface of the card the necessary wording "void".

The transmitter may of course be a powerful transmitter covering a considerable area but in an alternative arrangement there may be provided a plurality of less powerful transmitters, for example, a transmitter in each shop or shopping complex. The

signals to be transmitted by the transmitter will be provided by the credit card company, either by a direct landline or via a telephone line which may be continuously connected to the credit card company or may be connected at intervals, the information being stored in a suitable memory at the transmitter.

Figure 4 illustrates the electronic circuit of a preferred low power VLF type transmitter which operates from a mains supply but has a battery back-up. The encoder consists of a 12-bit binary code and is addressed by sending a binary code which is received down the telephone line from the credit card company. The transmitter is a carrier modulated type and may include an internal aerial which may be housed in a small plastic box which may be discreetly placed in a shop.

With regard to the card, in view of the low power output required the battery is expected to last for some years, certainly longer than the card should be in the hands of the user. The battery is in fact flexible to a very large extent so that normal use of the card is permitted.

When the battery is close to the end of its life the display will automatically be activated to invalidate the card but before this, means may be arranged so that a segment of the liquid crystal display may be activated to indicate that approximately 3 to 4 weeks of life is left in the card. Such an arrangement is also activated if the card is bent through more than 30°, thus acting as a safety feature against possible fraud.

In addition to this the liquid crystal display may have a small segment which is switched on and off to flash at one second intervals so long as the card is valid and the electronics within the card have not been tampered with or damaged in any way. Thus there may be provided electronic logic circuits within the card to check the operation of the electronics.

In an additional arrangement, the card may include a hand-shake transmitter. Thus when the card is invalid and the display is actuated a small transmitter will send an identical code back to the transmitter in the shop showing that the card has acted upon the instructions received and it is thus no longer necessary to transmit the coded signal relating to that card. Clearly after a period of time the number of invalid cards increases and it is necessary to try to delete from the system those cards which have been rendered invalid. Figure 5 shows a circuit for the shop or remote transmitter which also incorporates a receiver for receiving messages from credit cards.

If necessary, the card may continuously communicate with such a transmitter and receiver to indicate that the particular card is still valid or is invalid. Thus the system may be used to keep a check on cards at all times if necessary, although the battery power required to enable the credit card to transmit continuously would be great and in practice the transmission would only take place at regular intervals.

The liquid crystal matrix may be used to display other messages as desired.

It is intended that a frequency of 75kHz will be used to send data or code from the transmitter to the credit card. The code may be sent by transmitter in a binary form by pulse code modulation. The card contains a digital to analogue converter to convert the binary digital code into an analogue number code. A small amount of noise is introduced whilst doing this and so the code number should include a parity check which will check the signal received against the next signal received. If the two digital codes are the same then the invalidating operation will be commenced.

CLAIMS

1. An electronic credit card capable of displaying by means of a liquid crystal display a message or code which may be interpreted to provide information about the card holders status of account, by means of a remote transmitter which encodes information and transmits by means of electromagnetic waves to the said receiver contained within the said card.

2. A card as claimed in claim 1 in which a receiving element capable of decoding said information and showing a code or message on a display only when said transmitter transmits a code interpreting said message type.

3. A card as claimed in claim 1 or 2 in which said receiver contains within its thickness a minature battery providing said receiver with electric energy providing several years of use before expiry to supply said decoder and display with electric current.

4. A card as claimed in claim 3 in which an electronic voltage detecter system is set to a predetermined voltage reference and connected to said display showing when battery is no longer of use a permanent void or other means of indication on said display.

5. A card as claimed in any preceding claims where as a plurality of cards may be used with only a few transmitters or any number of transmitters placed within the boundary of a country providing a network of encoders over a large area and controlled by a remote means from a computer or other control unit.

6. A card or any other type of compact instrument provided with a receiver responsive to said transmitter device as claimed in claim 1.

Printed for Her Majesty's Stationery Office by
Croydon Printing Company (UK) Ltd, 2/87, D8817356.
Published by The Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.