APPARATUS TO READ FROM AND/OR WRITE INTO CHIP CARDS.

The invention concerns apparatus to read from and/or write on chip cards (microprocessor cards) storing at least one file relating to at least one issuer and consisting of at least one data set and comprising a header wherein are stored all information and codes for a secure accessing procedure, the files of different issuers being mutually separate.

Chip cards having a storage component illustratively in the form of a microchip or a magnetic strip are widely known. They are used for many purposes, for instance as telephone cards, health-insurance cards, check cards, credit cards, user identification or the like. The chip cards are issued to the user by the particular issuer of the data stored on the card, that is the post office, a health insurance, a credit institution or the like.

A read and/or write apparatus is required to read the data stored on the chip card or to write data into the chip card, and as a rule said apparatus is stationary, for instance in a cardphone or in an automatic teller.

Accordingly a card user can access the chip card data for purposes of reading and/or writing only at the locally fixed apparatus. Moreover such locally fixed read and/or write apparatus are costly and cumbersome. As a result the applicability of chipcards is restricted.

The object of the invention is to create a chipcard read and/or write apparatus storing at least one file related to an issuer and consisting of at least one data set and comprising a header storing all information and codes for secure access, the files of different issuers being separate, said apparatus allowing to read data stored on the chip card or writing on the chip card regardless of locally fixed systems and being of simple and economical design.

This problem is solved by the disclosure of claim 1.

Essentially the apparatus of the invention comprises a substantially flat, handheld housing receiving the devices needed to read from, display and/or to write on chip

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cards, in particular a power supply and a read/write unit and a display. Thereby is created a transportable, handheld apparatus making possible readout from, display of and/or writing on chip cards independently of locally fixed installations.

By means of the apparatus of the invention, the user is provided with a page-like readout of the data sets stored on the chip card and can obtain rapid overview of all data stored on the chip card by means of the display.

Especially advantageous chip cards are those allowing to store the files of different issuers, the data sets related to different issuers being stored separately from one another and their contents being determinable by the issuer itself. A data set to be stored is stored in the memory in memory sites which as a whole result in a rigorously defined information content and in this manner can be represented as one page. Illustratively a data set may be eligibility (for instance a travel ticket, an admission card, a seat reservation, a voucher), documentation (for instance a sales slip, a membership card, a professional ID, a receipt), information (for instance a time table, an address, the parking site of a car in a garage, a hotel room number), or advertizing.

If for instance the chip card is used to store travel tickets of a local-traffic service and if therefore the data sets are travel tickets, then the user, before setting out, can read the data sets stored on the chip card to make sure a data set representing a valid travel ticket is stored on the memory card. When beginning the trip, the particular data set on the chip card then can be canceled of devalued electronically, illustratively in reading and/or writing equipment installed in a city travel facility or in apparatus of the invention for instance carried by a conductor.

Another application for the apparatus of the invention is to represent the data sets as receipts, for instance of particular commercial enterprises. When purchasing, the user may have the apparatus of the invention on him and by reading the data sets stored on the chip card then can gain rapidly and easily an overview of his expenditures up to that time.

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When the user no longer needs the receipts, he may erase the relevant data sets using the apparatus of the invention.

The shape, size and outer geometry of the apparatus may be selected within wide limits.

The sub-claims disclose advantageous and appropriate further developments of the invention.

The invention is elucidated below by illustrative embodiments shown in the drawings.

Fig. 1 is a topview of a chip card,

Fig. 2 is a topview of a first illustrative embodiment of the apparatus of the invention with a partly inserted chip card,

Fig. 3 is an elevation of a narrow side of the apparatus of Fig. 2,

Fig. 4 is a perspective of a second embodiment of the apparatus of the invention,

Fig. 5 is a topview of a third embodiment of the apparatus of the invention,

Fig. 6 schematically shows the occupancy of the memory in a chip card, and

Fig. 7a-7d show various displays of the apparatus of the invention.

Fig. 1 shows a chip (microprocessor) card 2 consisting of a flat plastic card body 4 into which is embedded an omitted memory. A panel of contacts 6 is mounted on one of the flat sides of the chip card and consists of several contacts connected to the memory terminals. Access to the zone of the memory is made possible by means of the contact panel 6 and a read and/or write device further described below, for instance to read or to erase data sets stored on the chip card 2.

Fig. 2 shows apparatus 8 to read from and/or write on chip cards and comprises a flat, handheld housing 10. An LCD display panel 12 (hereafter display 12) is mounted on one flat side 11 of the housing 10 to display on that side a data sets stored in the chip card 2. In this embodiment the size of the display 12 is selected in such manner that a

particular data set can be displayed on the chip card 2. The housing comprises a keyboard 16 at a narrow side 14, said keyboard consisting of several keys of which only one is denoted by the reference 18. Using the keys 18, the user can operate the apparatus, for instance he may turn it ON or OFF and may read data sets stored in the chip card and reproduce them or cancel them on the display.

A slot not shown in the topview is present in a narrow side 20 to allow inserting the chip card 2 into the inside of the housing 10 as far as the read/write device not shown in the drawing.

Figs. 1 and 2 show that the topview size of the housing 10 substantially corresponds to the topview size of the chip card 2.

When being used, the chip card 2 is inserted in such manner into the housing 10 that the contact panel 6 makes electrical contact with the read/write device. In this read/write configuration, the chip card 2 can be fully received in the housing 10, or, as shown in Fig. 2, partly. The read/write device reads data sets stored on the chip card 2 and directly, or indirectly through a control device such as a microprocessor, drives the display 12 which then represents, in the form of a page, a particular data set stored on the chip card 2. This feature is shown in Fig. 2 illustratively as a page of a data set stored on the chip card 2 representing a local-traffic travel ticket.

Fig. 3 is an elevation in the direction of an arrow 22 pointing at the apparatus of Fig. 2. It is clear that the housing 10 is flat. Furthermore a slot 24 is present in the narrow side 20 to insert the chip card inside the housing 10, the inside width of the slot 24 substantially corresponding to the cross-section of the chip card 2. A switch, not shown, may be present inside the housing 10 so that when the chip card 2 is inserted into the housing 10, for instance the power is turned ON to at least a portion of the apparatus 8 or the read/write device shall be initiated.

When the apparatus 8 is being used, the flat side 26 of the housing 10 may rest on the user's palm and the keyboard 16 can be operated with the fingers of said palm. Accordingly the apparatus 8 can be operated with one hand.

Fig. 4 shows another embodiment of the apparatus of the invention. The same references as used in Figs. 2 and 3 are used for the same components. In this embodiment the flat housing 10 comprises a display 12 of which the size is selected in such manner that several data sets stored on the chip card 2 can be displayed simultaneously. Furthermore the keyboard 16 is mounted on the flat side and comprises a numeric panel, for instance to enter a code identifying the user. The slot 24 to insert the chip card, omitted from this Figure, inside the housing 10 is formed in the narrow side 20. Furthermore the housing 10 comprises a clearance 30 in the narrow side 28 allowing insertion of a paper strip, omitted from this Figure, into the housing 10 and into the zone of an omitted printer. The printer is used for a paper-strip printout of the data sets stored on the chip card 2.

The housing 10 also comprises at its narrow side 28 an interface 32 allowing connection of an omitted data cable by means of which the apparatus' read/write device can be connected to a PC or to an external storage medium.

Figs. 5 through 7 are discussed next.

Fig. 5 shows apparatus 8 to read from and/or write on chip (processor) cards 2, said apparatus 8 comprising a circular housing 38 assuming the shape of a case approximately the size of a saucer or a hand. Keys 40, 42, 44, 46 to operate apparatus 8 are mounted on the housing circumference. An LCD display 50 is present approximately centrally on one of the flat sides 48. An omitted slot to insert the chip (processor) card 2 is present in the cylindrical circumferential surface of the housing 38.

The keys 40, 42, 44 and 46 are ergonometrically distributed over part of the circumference of the housing 38 for one-hand operation so that when holding the housing 38 in one's hand, the fingers shall substantially rest on the keys. Preferably the keys when

in their rest position are flush with the circumferential surface and preferably are mounted inside arcuate clearances 52, 54, 56 and 58 in the edge.

Fig. 6 schematically shows the memory of chip card 2 storing various files composed of one or more data sets 60. The files comprise a header 62 which can be in the form of an intrinsic, dedicated file, or it may be in the form of one or several data sets in the file itself. All information and codes 64 assuring secure access are present in the header 62. Only the data issuer (for instance a service provider) may generate the data, read them, change or erase them. Another service provider can read the data only when permitted to do so by the data issuer in the form of a read code. The owner of the chip card 2 can read and erase all data without authorization by the particular issuer; however the said owner cannot generate or modify the data. The header 62 furthermore contains data 66 identifying the particular issuer, data 68 relating to the numeral of the device that generated the file and information 70 relating to the kind of data. Moreover the header 62 comprises a zone 72 containing a summary description of the data in plain text. Lastly the schematic and illustrative chip card shown in Fig. 6 also contains a zone 74 holding information about which group of issuers the file must be related to.

The data sets of various files also may all be stored as chained lists in one file because the header allows unambiguously accessing the mutually associated data sets. The data sets 60 contain the data contents proper, for instance an electronic travel ticket.

The owner of the apparatus 8 typically will carry this apparatus on his person. As described above, the apparatus is selected in size in such manner that the owner can conveniently hold it in his hand, for instance the left one, and that his fingers lie accurately on the keys.

If the user and owner of apparatus 8 wants an overview of the various eligibilities and information of his chip card, then he inserts the chip card 2 into the apparatus 8 and thereby the initial procedures of recognition and authorization take place between

chip card and apparatus. Said procedures being in the state of the art, they are not discussed further herein. The apparatus is turned ON as long as the chip card remains inserted.

Initially the apparatus 8 offers a first overview 76 on the display 50 as indicated by Fig. 7a. This first overview 76 reproduces the information stored in the header 74 of the chip card 2 and relating to the groups of issuers. The contents of this first overview 76 alternatively may also be located in the program of the apparatus 8 when such contents are rigorously predetermined, for instance following agreement with issuers. In the embodiment shown in Fig. 7a, said overview consists of six lines. Each line of this overview relates to one group of issuers.

A flag 78 appears in the uppermost line in the first column. Using the key 40, this flag 78 can be moved to lines directly below. After the flag has been moved to the desired location due to repeated depressing of the key 40, the key 42 is depressed. Following selection of the desired group of issuers, and with the help of the information 74 of the header 62 of the chip card 2, the program searches all files of this group of issuers and reproduces a second overview 80 on the display 50 (Fig. 7b) of the file summaries stored in the area 72 of the header 62. Using the keys 40 and 42, the selection procedure already described above for the overview can thus be carried out.

Furthermore there may be also one or several sequential pages for the overviews 76 and 80, as indicated by the flag 82. The key 46 then allows the user of the apparatus 8 to select the further pages. Any previous pages are indicated by an flag 84; the user then can select the previous pages using the key 44. When changing pages, the marker 78 obviously is transferred into the upper or lower line of the particular overview.

Following the selection procedure and selecting a line of the overview 80 using the key 42, the program opens the data sets 60 belonging to that page and if said sets were compressed will decompress them, and represents them on the display 50 as a page 86 as shown in Fig. 7c. Page 86 lists the information written by the service provider, for instance the local-traffic service in this case, into the chip, in plain text.

The data of the data sets are organized as pages and consequently the display will always be represented similarly. This is the case also when the chip card is read in a public service apparatus or in a computer chip-card readout. All information, the data themselves, furthermore the meanings, are stored, possibly compressed or coded, in the data sets associated with the page. This procedure offers the advantage that the information issuer need not agree about contents, for instance the meaning of given data, with other issuers. If the issuer knows its data, he also can reinterpret them for monitoring purposes. Each issuer itself configures its eligibility ticket according to content and form. Thus one page corresponds for instance to a travel ticket. The principle remaining unchanged, the user easily understands the operation.

Sequential pages may exist, as they do relative to the overview 76, 80, in the actual display pages 86, said sequential pages being selectable using the same procedure by means of the flags 78, 82, 84 and keys 44 and 46.

The program of the apparatus 8 is designed in such manner that after depressing the key 46, the second overview 80 (Fig. 7b) shall be shown, whereby another selection is possible.

The user can erase one page, and any ensuing pages, by selecting the corresponding page and simultaneously depressing the keys 40 and 46. Thereupon the apparatus 8 shows an inquiry 88 on the display as illustrated in Fig. 7d. If upon said inquiry 88 the user depresses the key 42, the apparatus 8 will erase the corresponding page(s).

The key array of the apparatus 8 shown in Fig. 5 is merely didactic. However this illustration shows that 4-key operation is possible.

The file header 62 of the chip card 2 may comprise a varying amount of information and codes as already described above. However it may also include language codes.

CLAIMS

1. Apparatus for reading from and/or writing on chip (microprocessor) cards (2) storing at least one file related to at least one issuer and consisting of at least one data set (60) and comprising a header (62) storing all information and codes (64-74) for secure access, the files from different issuers being mutually separated,

having a substantially flat, handheld housing (10, 38),

having a power supply mounted in the housing (10, 38),

having a read/write device mounted in the housing (10, 38),

having a slot (24) in one of the narrow sides (20) of the housing (10, 38) to insert a chip card (2) into the housing and into the zone of the read/write device,

having an operating device to operate the apparatus, and

having a display (12, 50) connected to the read/write device to display at least one data set, the data sets being organized in such manner that one or more data sets can be represented as page(s) on the display (12, 50).

2. Apparatus as claimed in claim 1, characterized in that a set of data is present in the header (62) of the chip card (2) or in the apparatus (8)-program to read and/or write which can be displayed in at least one first overview (76) of the display (12, 50), the data of said set being organized in such manner that they are related line-wise to the issuers and can be selected using an operating device.

3. Apparatus as claimed in either of claims 1 and 2, characterized in that a summary description (72) of the data is present in plain text in the header (62) of the chip card (2) and can be displayed in at least a second overview (80) of the display (12, 50).

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4. Apparatus as claimed in claim 1, characterized in that the data sets of various files are stored as chained lists in a file and are accessible through header information and in that related data sets of the files are accessible to the apparatus (8) through related information stored in the header (62).

5. Apparatus as claimed in one of the above claims, characterized in that the display comprises a display panel (12, 50).

6. Apparatus as claimed in claim 5, characterized in that the size of the display panel (12, 50) is selected in such manner that at least one page stored on the chip card (2) can be displayed simultaneously.

7. Apparatus as claimed in either of claims 5 and 6, characterized in that the display panel (12, 50) is an LCD display.

8. Apparatus as claimed in one of claims 1 through 7, characterized in that the display panel (12, 50) is mounted on one of the flat sides (11, 48) of the housing (10, 38).

9. Apparatus as claimed in one of claims 6 through 8, characterized in that the size of the display panel (12) substantially corresponds to the size of the flat side (11) of the housing (10).

10. Apparatus as claimed in one of the above claims, characterized in that the chip card (2) is received substantially fully inside the housing (10, 38).

11. Apparatus as claimed in one of the above claims, characterized in that the operating device comprises a keyboard (16).

12. Apparatus as claimed in claim 11, characterized in that the keys of the keyboard (16) are mounted at least in part on a narrow side (20) of the housing (10).

13. Apparatus as claimed in claim 1, characterized in that the housing (38) evinces the shape of a circular box the size of a saucer or of a hand, operating keys (40-46) being mounted on its circumference, and is fitted approximately centrally on one of its flat sides (48) with the display (50), the slot for inserting the chip (microprocessor) card (2) being present on its circumferential surface.

14. Apparatus as claimed in claim 13, characterized in that the keys (40-46) are mounted ergonomically for one-hand operation on the circumference in such manner that when holding the apparatus (8) in one hand, the fingers shall substantially rest against the keys.

15. Apparatus as claimed in claim 14, characterized in that in their rest position the keys are flush with the cylindrical peripheral surface of the housing (38) and are mounted in arcuate clearances (52-58) in the edge of the housing.

16. Apparatus as claimed in one of the above claims, characterized in that the apparatus (8) comprises a printer connected to the read/write device.

17. Apparatus as claimed in one of the above claims, characterized in that a switch actuated by the chip card (2) is present inside the housing (10, 38).

18. Apparatus as claimed in claim 17, characterized in that the switches turns ON at least part of the apparatus' power supply.

19. Apparatus as claimed in either of claims 17 and 18, characterized in that the switch actuates the read/write device and/or the display.

20. Apparatus as claimed in one of the above claims, characterized in that the power supply comprises at least one battery.

21. Apparatus as claimed in one of the above claims, characterized in that the apparatus (8) comprises an interface (32) connected to the read/write device to transfer data from or to the read/write device.

22. Apparatus as claimed in one of the above claims, characterized in that means are present inside the housing (10, 38) mechanically prestressing the chip card (2) being inserted against the direction of insertion.

23. Apparatus as claimed in one of the above claims, characterized in that following its insertion, the chip card (2) snaps into the housing (10, 38) and is ejected by an ejection device.

24. Apparatus as claimed in one of the above claims, characterized in that the read/write device is designed to only read and cancel data.