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(54) **ELECTRONIC DATA STORAGE MEDIUM WITH FINGERPRINT VERIFICATION CAPABILITY**

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(57) **ABSTRACT**

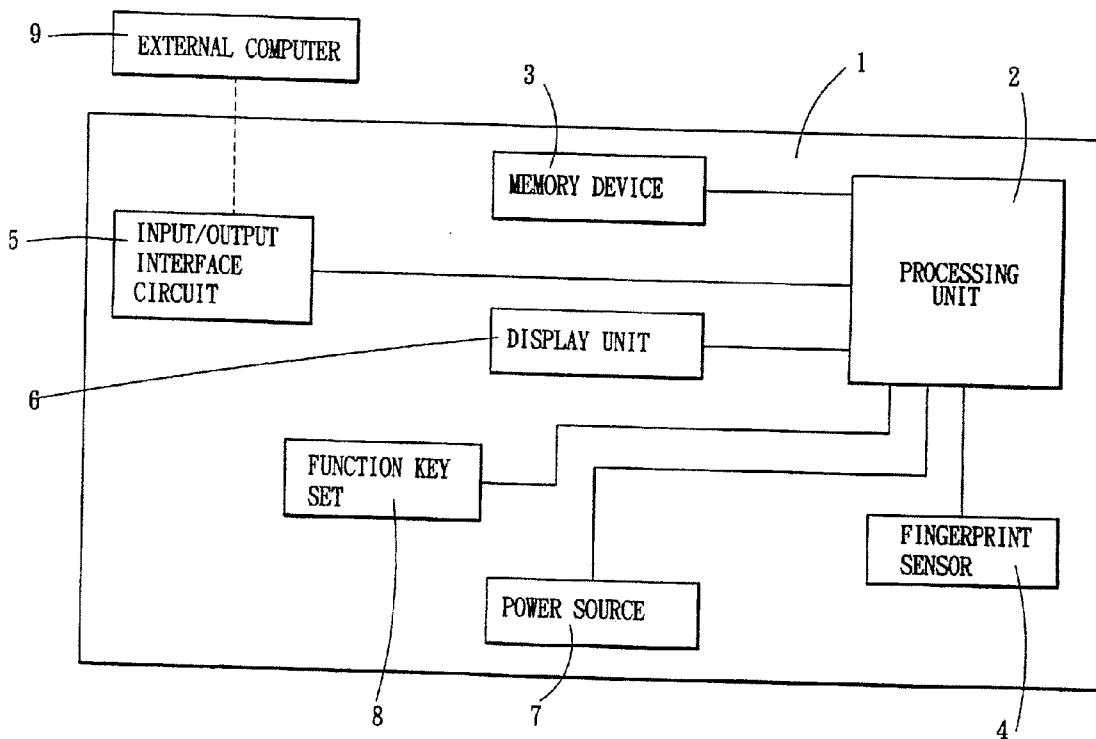
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An electronic data storage medium is adapted to be accessed by a data terminal, and includes a processing unit connected to a memory device that stores a data file and security reference data possessed by a person authorized to access the data file, and an input-output interface circuit activable so as to establish communication with the data terminal. The processing unit is operable selectively in a programming mode and a data retrieving mode. The electronic data storage medium also includes a function key set for manually switching the electronic data storage medium between the programming mode and the data retrieving mode.

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**Related U.S. Application Data**

(62) Division of application No. 11/624,667, filed on Jan. 18, 2007, which is a division of application No. 09/478,720, filed on Jan. 6, 2000, now Pat. No. 7,257,714.



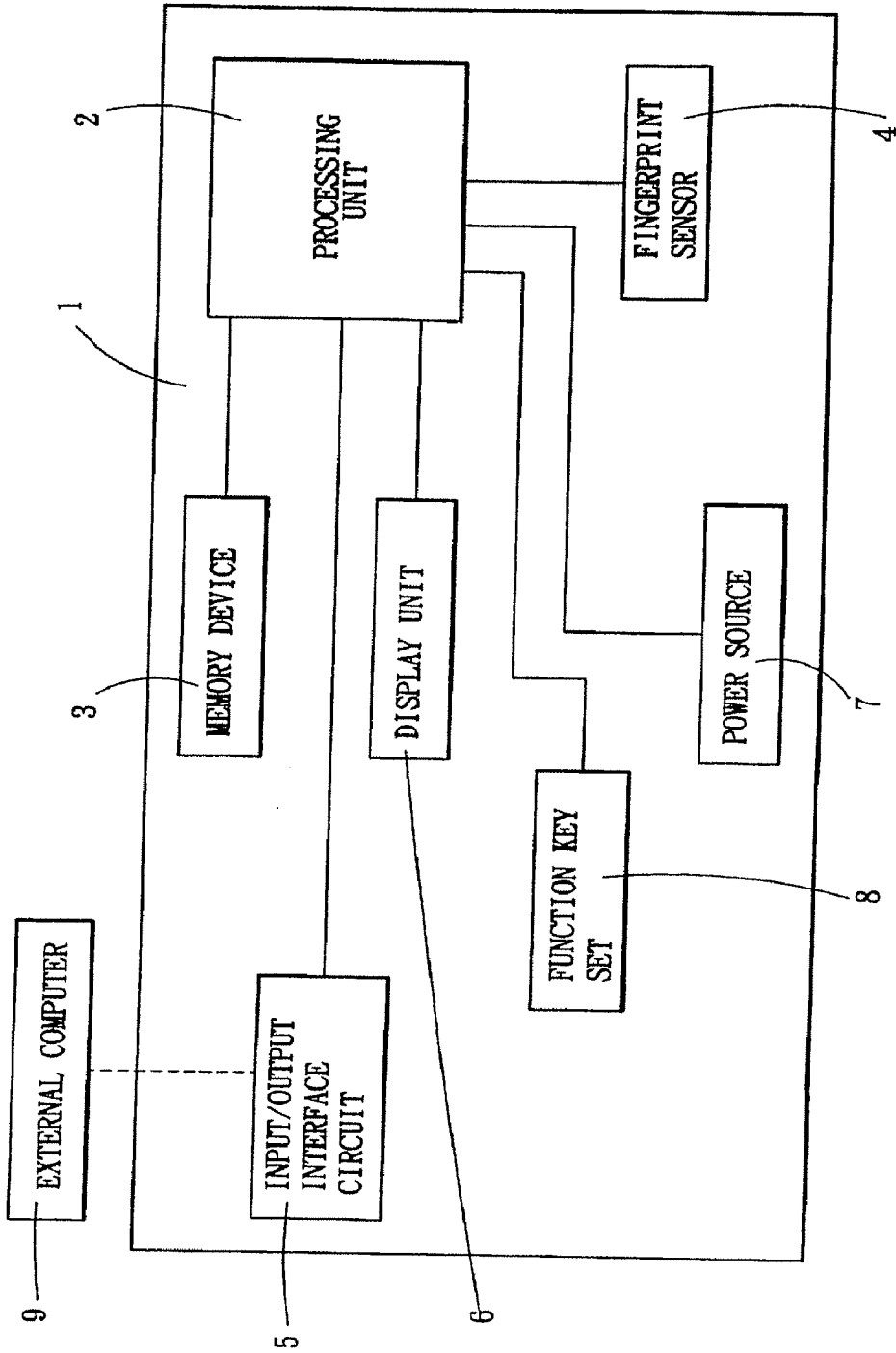


FIG. 1

**ELECTRONIC DATA STORAGE MEDIUM WITH FINGERPRINT VERIFICATION CAPABILITY**

RELATED APPLICATIONS

[0001] This application is a divisional of U.S. application Ser. No. 11/624,667, filed Jan. 18, 2007, entitled "ELECTRONIC DATA STORAGE MEDIUM WITH FINGERPRINT VERIFICATION CAPABILITY", which is a divisional of U.S. patent application Ser. No. 09/478,720, filed Jan. 6, 2000, now issued as U.S. Pat. No. 7,257,714, entitled "ELECTRONIC DATA STORAGE MEDIUM WITH FINGERPRINT VERIFICATION CAPABILITY", which has been petitioned claiming benefit of Continuation-In-Process status of one of inventor's earlier U.S. patent application Ser. No. 09/366,976, filed Aug. 4, 1999, now issued as U.S. Pat. No. 6,547,130, entitled "INTEGRATED CIRCUIT CARD WITH FINGERPRINT VERIFICATION CAPABILITY".

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] The invention relates to an electronic data storage medium, more particularly to an electronic data storage medium with a fingerprint verification capability.

[0004] 2. Description of the Related Art

[0005] At present, confidential data files are stored in floppy disks or are delivered via networks that require passwords or that use encryption coding for security. Confidential documents can be sent by adding safety seals and impressions during delivering. However, the aforesaid are exposed to the risks of breaking of the passwords, encryption codes, safety seals and impressions, thereby resulting in unsecure transfer of information.

SUMMARY OF THE INVENTION

[0006] Therefore, the object of the present invention is to provide an electronic data storage medium with a fingerprint verification capability for security during the transfer of information.

[0007] According to the present invention, an electronic data storage medium is adapted to be accessed by a data terminal. The electronic data storage medium includes a memory device, a fingerprint sensor, an input-output interface circuit and a processing unit.

[0008] The memory device stores a data file and fingerprint reference data obtained by scanning a fingerprint of a person authorized to access the data file.

[0009] The fingerprint sensor is adapted to scan a fingerprint of a user of the electronic data storage medium and to generate fingerprint scan data.

[0010] The input/output interface circuit is activable so as to establish communication with the data terminal.

[0011] The processing unit is connected to the memory device, the fingerprint sensor and the input/output interface circuit. The processing unit is operable selectively in

[0012] a programming mode, where the processing unit activates the input/output interface circuit to receive the data

file and the fingerprint reference data from the data terminal, and to store the data file and the fingerprint reference data in the memory device, and

[0013] a data retrieving mode, where the processing unit receives the fingerprint scan data from the fingerprint sensor, compares the fingerprint scan data with the fingerprint reference data in the memory device to verify if the user of the electronic data storage medium is authorized to access the data file stored in the memory device, and activates the input/output interface circuit to transmit the data file to the data terminal upon verifying that the user of the electronic data storage medium is authorized to access the data file stored in the memory device.

BRIEF DESCRIPTION OF THE DRAWING

[0014] Other features and advantages of the present invention will become apparent in the following detailed description of the preferred embodiment with reference to the accompanying drawings, of which:

[0015] FIG. 1 is a schematic circuit block diagram illustrating the preferred embodiment of an electronic data storage medium according to the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0016] Referring to FIG. 1, according to the preferred embodiment of the present invention, an electronic data storage medium is adapted to be accessed by an external computer 9, and is shown to include a card body 1, a processing unit 2, a memory device 3, a fingerprint sensor 4, an input/output interface circuit 5, a display unit 6, a power source 7, and a function key set 8.

[0017] The memory device 3, such as a flash memory device, is mounted on the card body 1, and stores a data file, a reference password, and fingerprint reference data obtained by scanning a fingerprint of a person authorized to access the data file in a known manner therein. The data file can be a picture file or a text file.

[0018] The fingerprint sensor 4 is mounted on the card body 1, and is adapted to scan a fingerprint of a user of the electronic data storage medium and to generate fingerprint scan data. One example of the fingerprint sensor 4 that can be used in the present invention is that disclosed in a co-owned U.S. Pat. No. 6,547,130, entitled "INTEGRATED CIRCUIT CARD WITH FINGERPRINT VERIFICATION CAPABILITY", the entire disclosure of which is incorporated herein by reference.

[0019] The input/output interface circuit 5, such as a PCMCIA or RS232 interface, is mounted on the card body 1, and is activable so as to establish communication with the external computer 9.

[0020] The processing unit 2 is mounted on the card body 1, and is connected to the memory device 3, the fingerprint sensor 4 and the input/output interface circuit 5. The processing unit 2 is operable selectively in:

[0021] a programming mode, where the processing unit 2 activates the input/output interface circuit 5 to receive the data file and the fingerprint reference data from the external computer 9, and to store the data file and the fingerprint

reference data in the memory device 3 in a compressed format to increase storage capacity of the memory device 3;

[0022] a data retrieving mode, where the processing unit 2 receives the fingerprint scan data from the fingerprint sensor 4, compares the fingerprint scan data with at least a segment of the fingerprint reference data in the memory device 3 to verify if the user of the electronic data storage medium is authorized to access the data file stored in the memory device 3, and activates the input/output interface circuit 5 to transmit the data file to the external computer 9 upon verifying that the user of the electronic data storage medium is authorized to access the data file stored in the memory device 3; and

[0023] a data resetting mode, where the data file and the finger reference data are erased from the memory device 3.

[0024] The power source 7 is mounted on the card body 1, and is connected to the processing unit 2 for supplying electrical power thereto.

[0025] The function key set 8, which is mounted on the card body 1, is connected to the processing unit 2, and is operable so as to initiate operation of the processing unit 2 in a selected one of the programming, data retrieving and data resetting modes. The function key set 8 is operable to provide an input password to the processing unit 2. The processing unit 2 compares the input password with the reference password in the memory device 3, and initiates operation in the data resetting mode upon verifying that the input password corresponds with the reference password.

[0026] The display unit 6 is mounted on the card body 1, and is connected to and controlled by the processing unit 2 for showing the data file exchanged with the external computer 9 and the operating status of the electronic data storage medium thereon.

[0027] Preferably, the processing unit 2 automatically initiates operation in the data resetting mode upon detecting that a preset time period has elapsed since storage of the data file and the fingerprint reference data in the memory device 3.

[0028] The following are some of the advantages of the present invention:

[0029] The electronic data storage medium has a small volume but a large storage capability in a compressed format, thereby resulting in convenience during data transfer.

[0030] Since everyone has a fingerprint different from that of the others, the electronic data storage card medium only permits authorized persons to access the data files stored therein, thereby resulting in enhanced security.

[0031] While the present invention has been described in connection with what is considered the most practical and preferred embodiment, it is understood that this invention is not limited to the disclosed embodiment but is intended to cover various arrangements included within the spirit and scope of the broadest interpretation so as to encompass all such modifications and equivalent arrangements.

I claim:

1. An electronic data storage medium adapted to be accessed by a data terminal, said electronic data storage medium comprising:

a non-volatile memory device for storing at least a data file, wherein all data files are stored and located in different sectors of said non-volatile memory device, wherein said non-volatile memory device is a multi-level-cell flash memory device;

an input/output interface circuit for establishing communication with the data terminal, wherein said input/output interface circuit is a card reader interface circuit which comprises of a Universal Serial Bus interface circuit.

a processing unit coupled to said non-volatile memory device and said input/output interface circuit, wherein said processing unit includes means for selectively operating in a programming mode in which said processing unit activates said input/output interface circuit to receive the data file from said data terminal and stores the data file in said non-volatile memory device, a data retrieving mode in which said processing unit accesses the data file stored in said non-volatile memory device and activates said input/output interface circuit to transmit the data file to said data terminal, and a data resetting mode in which the processing unit facilitates erasing of the data file from said non-volatile memory device, wherein said processing unit includes means of compressing the data file for storing in said non-volatile memory device and means of decompressing the data file for retrieving from said non-volatile memory device;

a function key set for initiating operation of said processing unit in a selected one of the programming, data retrieving and data resetting modes;

a display unit for displaying the data file and operating status of the electronic data storage medium;

a power source such as a battery for providing electrical power to the electronic data storage medium;

means for mode switching of the electronic data storage medium among the programming mode, the data retrieving mode and the data resetting mode;

means for controlling said processing unit when the electronic data storage medium is in the programming mode such that the processing unit transfers from the data terminal at least one data file through the input/output interface circuit into said non-volatile memory device;

means for controlling said processing unit when the electronic data storage medium is in the data retrieving mode such that the processing unit transfers at least one data file stored in the non-volatile memory device through the input/output interface circuit to the data terminal; and

a card body as a substrate on which said non-volatile memory device, said input/output interface circuit, said processing unit, said function key set, said display unit and said power source are mounted.